Appendix B

League of Wilderness Defenders
Blue Mountain Biodiversity Project

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League Of Wilderness Defenders ~
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Minimum Mandatory Guidelines for all projects which purport to be Restoration or Forest Health projects in Interior Pacific Northwest Forests

I. Commercial logging cannot be a major objective of the project. Any commercial logging included in the project must be secondary in consideration, its potential resulting only from the implementation of needed methods to meet the project's goals. Funding for a project proposed as "restoration" or "forest health" can not be tied to commercial logging. The financial means to accomplish the project and its goals must be firmly established and be independent of any proposed commercial logging. Commercial logging utilized in restoration/forest health projects must fully meet all of the following conditions:

A. No logging trees above 12 inches D.B.H.
B. No logging on steep slopes above 30 degrees.
C. No logging on slopes above 20 degrees which are geologically unstabl prone to erosion, slumping, and/or slides.
D. No logging within riparian areas; including rivers, streams, creeks, seasonal and ephemeral drainages, runoff draws, seep and spring areas ponds, lakes, bogs, swamps, and seasonal bogs. No logging within established buffers for any of the above. PACFISH and INFISH buffers must be doubled when the slope angle exceeds 15 degrees and/or when the soils are geologically unstable and prone to erosion, slumping, or landslides.
E. Heavy machinery and/or logging methods which result in further compaction of area soils can not be used.
F. Subsoiling is not a viable "mitigation" for compaction due to its destructive effects upon the forests' soil fungal, microbial, and vegetative communities. Subsoiling may only be utilized in restoration of areas previously compacted--such as closed road beds, log landing decks, skid trails, closed mine sites, areas of heavy livestock compaction or recreational over-use. Subsoiling cannot be used when it will result in further soil erosion and sedimentation to area aquatic systems.
G. Canopy closure of 60% in mixed conifer stands and 45% in ponderosa pine stands must be retained. If canopy closure is below these percentages no commercial logging can occur at all.
H. No extirpations of any old growth dependent and/or forest canopy dependent species can occur within the project area, including any of its individual "units".
I. Site specific surveys for all species which currently utilize project areas must be conducted as part of the project's development

and planning.

J. All habitat requirements and components must be retained for all old growth and forest canopy dependent species, including: goshawks, pileated woodpeckers, black-backed and northern three-toed woodpeckers white headed woodpeckers, pygmy and flammulated owls, pine marten, fisher, wolverine, lynx, townsends big-eared bat, neo-tropical migrant birds, etc.

K. Watershed quality must be maintained and improved by the project.

L. Habitat conditions for all fisheries and aquatic listed species and species of concern must be maintained and improved by the project. No "take"/mortality of any individual members of listed species can be permitted. No extirpations of any of these species can occur.

M. Livestock grazing issues, concerns, and degradation must be addressed and conditions must be improved, including implementing as needed livestock exclosures, reductions in numbers of livestock, removal of livestock, and/or resting or terminating grazing allotments. Livestock grazing can not be "outside the scope of this project".

N. The cumulative impacts of all management/extraction activities on project area and adjacent public and private lands must be addressed and disclosed in the project's analysis and planning. Wildlife, fisheries, and ecosystems do not recognize artificial human societal boundaries. Projects must be modified to address cumulative area impacts and cooperation sought of adjacent area private landowners in achieving restoration objectives.

O. Absolutely no new road construction, including no "temporary" roads and no re-opening, or temporary use of, any closed roads.

P. No commercial logging in roadless areas larger than 500 acres. No tree-felled fuel breaks, helicopter landing pads, or industrial incursions that would change the natural historical character of any of these roadless areas.

Q. The extent of prescribed fires must stay within the area's historical natural range of variability for fire intervals and number of acres burned. Spring burning should not occur in areas in which it was historically uncommon. Aerial ignition of prescribed fires must not be utilized to avoid detrimental impacts to wildlife dens, nests, middens, burrows, sensitive plants, and needed habitat components. Unnatural fuel breaks cannot be created.

R. Wildlife corridors with sufficient hiding cover, including necessary natural thickets must be retained.

S. New OHV/ORV trails cannot be part of the project.

T. The project cannot result in the further spread of exotic invasive plants. Chemicals and/or herbicides cannot be utilized by the project.

U. Chemicals, pesticides, or biocides cannot be utilized to kill, control or manipulate any native insect species populations, including periodic "outbreak" cycles (which are a natural component of forest ecosystems)

V. No misapplication of blanket ecosystem theories, eg: "ponderosa pine park-like stands", "fir encroachment", etc. to historic mixed conifer stands or dense mid to high elevation multi-storied p.pine stands, etc Proposed project planning must be site specific, accurate, and ground truthed as to the actual historic natural composition and density of area forest stands. Planning must also address the cumulative impacts to the area's adjacent forest habitat and the current wildlife dependence and utilization of the project area, and be modified accordingly to protect wildlife needs and long-term area recovery.

W. Non-commercial methods to accomplish project goals must be presented as viable alternatives and their impacts accurately assessed as compared to any proposed commercial methods.

X. Proposed projects must fully comply with all environmental policy laws of this nation. The NEPA process must be utilized with full appeal and litigation rights. Negotiations resulting in the seperation of portions of projects which have environmental, public, and scientific consensus may be utilized to allow necessary timely projects to proceed. An automatic stay upon all controversial portions of projects pending final outcome of judicial review, including appeal, must be granted as part of project guidelines.

Y. Projects must address how to restore unregenerated and under regenerated old logging cuts, and other detrimental impacts from past management activities (skid trails, slash piles, high road densities, sources of continuing sedimentation, excessive high water temperature etc.). Projects must focus on providing solutions to these serious issues before proposing any more commercial logging--of any type--within the project area.

Z. This is a draft after all, so this is left open to acknowledge and facilitate incorporation of areas and issues which need to be include in these guidelines.

II. Projects as a whole should also meet all of the above guidelines, including non-commercial restoration projects. All proposed projects should incl both non-commercial methods for accomplishing their goals as well as viabl funding sources for their accomplishment. Agencies are encouraged to work with citizen environmental activist groups and area private landowners in developing comprehensive and potentially successful ecosystem restoration projects.

III. Monitoring and Compliance: All projects must be honestly and accurate monitored for compliance with all of the above guidelines, both by responsible agency personnel (who must be adequately funded and equipped) and by independent groups. Projects must be halted when the above guidelines are not being met, or whenever it becomes apparent that the projects restoration goals cannot be achieved by the methods then utilized.

Restoration and forest health is a relatively new undertaking on the current scale and focus for many public agencies and their personnel. Commercial contractors and companies, not limited to logging personnel, are even more recent (and historically reluctant) to embrace these concepts in word. The track record on the ground however, remains dismally close to the old destructive 'business as usual', especially with respect to loggin grazing, mining, and roading projects. It must be acknowledged that the transition towards ecologically responsible projects being initiated will take time. Indeed, the very ability and credibility of agency projects are beyond being "in question", they need to be redeemed. This can only be don with honesty, dilligence, adequate funding, and a sincere effort at strict compliance with all necessary guidelines. Monitoring and compliance, to be effective, needs to have serious teeth. Repeat violators of project guidelines must not only be stopped, they must also be prohibited from further commercial activities on public lands and be required to provide recompens for the damage they incur. Such provisions need to be included within the projects proposals.

For the Forests, Wildlife, and Fish,

Asante Riverwind

Asante Riverwind, co-director

Wildlife & Forest Health

Exhibit A

Goshawk (Northern Goshawk, Accipiter Gentilis)

Habitat and Nesting Requirements:

*canopy closure usually between 60 to 90% Nests of neighboring goshawks are at a minimum two miles apart. A 1982 Oregon study found that 95% of 74 nests were in old growth (a CA study found a higher percentage of nesting in mature -especially when old growth was not present). Great Grey Owls use old goshawk nests. Home range of a nesting pair is typically around 6,000 acres. Habitat quality has decreased due to logging and fire suppression. Status of the Northern Goshawk in Oregon and Washington, David Marshall 1992.

* Nests in large trees in old growth stands, frequently the largest tree in the stand -with a high degree of canopy closure. (Reynolds, 1989)

* Mean tree density for 7 analyzed nest sites was 195 trees/acre (max. 304, min. 110). Mean canopy closure was 59.8%. (Reynolds et al, 1982)

* A study of 34 goshawk nests in Eastern Oregon found nests were in "older growth coniferous stands" with a mean dbh of nest trees of 20 inches. (Moore and Henny, 1983)

* Requires mature to old growth with 60 to 65% canopy closure for nesting sites. (Fleming, 1987)

* Requires old growth forest for nesting. In 12 nest sites studied in NW CA, canopy closure exceeded 60% for all nests and averaged 88%. (Hall, '84)

* A study of 13 nests in CA found 67% were in stands dominated by dense conifer growth. (Saunders, 1982)

* Canopy closure averaged 76% in a study of 36 nest areas. No nests were found with canopy closure less than 60%. Much higher rates of nesting were found in areas with 70 to 79% canopy cover than in areas with 60 to 69% cover. (Crocker-Bedford, and Chaney, 1988)

* Nesting goshawks prefer stands of dense-canopied large trees. (Crocker-Bedford, 1990)

* An Eastern Idaho study of 48 goshawk nests found 83% of the nests were in Douglas-fir with a mean tree age of 164 years and a mean dbh of 20.5 inches. Canopy cover was 72% in Douglas-fir and aspen and 67% in lodge pole pine. (Patla, 1991)

* A study of goshawk nests in Idaho and Montana found nest sites in "mature to overmature conifer forest with a closed canopy (75-85% cover) (Hayward and Escano, 1989)

* A New Mexico study of 11 active nests found goshawks selected large diameter trees for nesting. (Kennedy, 1988)

* Twenty nest sites studied in Colorado were seldom farther than 900 feet from water, all had openings inhabited by ground squirrels of one or more acres within 1150 feet of the nest. Nests were in the oldest stands within the areas used. (Shuster, 1980)

* A study of goshawk nests in New York found goshawks selected sites with greater tree basal areas, greater numbers of large trees, near water, away from human habitation, preferred conifer over oak and had fewer saplings. (Speiser and Bosakowski, 1987).

* The majority of goshawk studies in the West have found that goshawks nest in mature stands with a high basal area of large trees and high canopy closure. (Woodbridge et al, 1988)

* Protecting 20 acre nest buffers will not maintain goshawk reproduction in areas in which even moderate tree

harvesting occurs. (Crocker-Bedford, 1990)

* Goshawk home range comprises "the entire area that a goshawk uses for nesting, foraging, resting, watering, etc." (Patla, 1991)

* 30 acres nesting, 420 acres post fledgling, and foraging areas of 5,400 additional acres. The PFA is an area of concentrated use during the fledgling period -and is defended as such. (Reynolds, 1991)

* A study in Arizona on selectively logged goshawk nesting areas found the reoccupancy rate dropped by 80% and nestlings dropped by 94% in these logged areas. It was concluded that timber harvesting caused a decline from an estimated 260 nesting pairs of goshawks to approximately 60, despite the fact buffers were left around nest sites. Even with large nest buffers, reproduction nearly ceased, indicating that factors other than nesting habitat are critical for goshawk reproduction. These may include: occupancy of former goshawk territories by other raptors, a change from old growth structures to early successional structures, and reduced prey populations caused by timber harvesting. (Crocker-Bedford, 1990)

* An Arizona study of 53 nesting territories, comparing nestling reproduction of non-logged areas with areas logged during the 1973-86 period:
14 nest territories with little or no logging produced 1.57 nestlings per territory.
12 nest territories in which logging (selective) occurred on 10 to 39% of the territory produced 0.75 nestlings per territory.
16 nesting territories in which logging occurred on 40 to 69% of the territory produced 0.31 nestlings per territory.
11 nesting territories in which logging occurred on 70 to 90% of the territory produced 0.00 nestlings.
(Crocker-Bedford, 1991a)
(the above report indicated that goshawk population numbers were dangerously low in the area due to timber harvesting)

* A study of 9 logged areas formerly used by goshawks found red-tailed hawks nesting in three, and great horned or long-eared owls in four. Goshawks did not reoccupy these areas, while in unlogged control areas there was no replacement of goshawks with other species. (Crocker-Bedford, 1990)

* Goshawk and red-tailed hawk nests are seperated by considerable distance. (Bendire, 1892)

* Great Grey Owls may depend upon goshawks for nesting sites within parts of its home range. (Patla, 1991)

* Of 46 Great Grey Owl nests in N.E. Oregor 68% were originally made by goshawks. (Bull et al, 1988)

* 6 of 11 Great Grey Owl nests found in Central Oregon were in old goshawk nests. (Bryan and Forsman, 1987)

* A N. CA study of post nesting goshawk found female home ranges up to 5,930 acres and male of up to 7,018 acres. (Hargis et al, 1991)

*Territorial Densities -distances between goshawk pairs:
*none nearer than two miles (Bendire, 1882)
* between 2.4 and 5 miles (Reynolds and Wright, 1978)
* in 34 goshawk territories it was a minimum of 2 miles. (Patla, 1991)
* Wallowa-Whitman N.F., mean distance between 97 territories: 3.2 miles (Ralp Anderson & Tim Schommer)

* Home Ranges:
*during the nesting period: for females (8 studied) 173 to 1,927 acres and for 2 males: 840 to 2,347 acres. (Hargis et al, 1991)
* for 5 males: 1,475 to 4,554 acres
for 5 females: 3,652 to 10,428 acres (Austin, 1992 in prep.)
*between 5,000 to 6,000 acres (Reynolds)
* Only by restricting timber harvesting within the entire nesting and feeding areas can we assure continued reproduction of goshawk pairs -exceeding 5,000 acres per pair. (Crocker-Bedford, 1990)
* 2,224 acres around the nest be protected (Hargis et al, 1991)
* retaining single 50 to 100 acre habitat patches will not succeed because it does

not account for use of alternate sites. (Woodbridge et al, 1988)

* Three nest areas of 30 acres each plus three replacement areas of 30 acres each for a total nest area of 180 acres, surrounded by a post fledgling area of approx. 420 acres and additional foraging of 5,400 acres. (Reynolds et al, 1991)

* Timber harvest is a threat to goshawk populations. (Bloom et al, 1986, Crocker-Bedford, 1990, Hall, 1984, Hargis et al, 1991 Moore and Henny, 1983, Patla, 1990/91, Reynolds and Wight, 1982, Reynolds, 1983/89, Saunders, 1982, Woodbridge et al 1988,

* Home ranges are generally 5,000 to 8,000 acres (Reynolds, 1983)

* Summer ranges may be as large as 10,000 and even 17,000 acres in fragmented habitat. (Austin, pg. 30 R. Silver et al Goshawk petition, 1991)

*"Other raptors replaced goshawks in most logged areas in my study" (Crocker-Bedford, 1990)

*In harvested forest goshawks could be outcompeted and preyed upon by great horned owls and red-tailed hawks. (Moore and Henny, 1983)

* Additional studies which show that goshawk almost always nest in mature or old growth stands which have dense overstory canopies: (Bent, 1937, Bartelt, 1977, Hennessy, 1978, Jones, 1980, Mannan and Meslow, 1984, Bloom et al, 1985, Herron et al, 1985, Fowler, 1988, Falk, 1990, Warren et al, 1990, Zinn and Tibbits, 1990, Siders and Kennedy, 1993, Patla and Trost, 1993, Smith and Mannan, 1993, Kimmel and Yahner, 1993)

*Radio telemetry studies which demonstrate most foraging occurs in mature or old growth stands: (Widen 1985, Fischer 1986, Austin 1991, Hargis et al 1993, AZ Dept. of Fish and Game 1993a)

* Home ranges of the Queen Charolette Goshawk varied from 4,700 to 288,000 acres and are much higher in severely fragmented areas. (Alaska Dept. of Fish and Game, 1992)

Exhibit B

****PILLEATED FACT SHEET*****

WA Dept. of Wildlife Management Recommendations for Priority Species
PP. 1, para. 5 "They may excavate large rectangular holes during nesting that may be used by smaller birds for nesting and roosting."
PP.2, para. 7, ln. 2-5 "Recent studies from western Oregon show lower densities and a mean home range that is twice the size found inthe Nort east Oregon."(Mannan '84, Mellen '87) "The minimum management recommendations should be chamged to reflect these regional differences."
PP.2, para. 1, ln 1-3, 6-8
"Also, Conner '79) notes that managing for the minimum habitat componen may cause gradual population declines. Instead, he suggests that avg. values for habitat elements be used in forest management...nesting area should be managed for long rotations. Perhaps the MMR's should be rev sed using mean values of habitat components rather than minimum values. (Wild Soc Bull 14:142-146)
para.2, lines 1-4 Mannan ('84) and Mellen ('87) question the suitability of the pilleated as an indicator species that may need less than other snag dependent species andfor the old growth community since pilleated alsouse riparian hardwoods and forage in immature stands."
para. 5, ln 1-6
"Woodpeckers, along with other insectivores, play an important role in reducing insect populations at endemic levels. Biological control of forest insects is preferred over use of insecticides. It has a longer term effect to regulate future insect outbreaks and is less costly and non-toxic. Management to increase the woodpecker populations should hav the secondary benefits of increasing other insectiveres (birds) and controlling insect outbreaks." (Takekawa et al. '82, 47th No. Am. Wild life and Nat. Res. Conf. Trans. p. 393-409)

Evelyn Bull/ Population Density, Home range size, and habitat use of Pilleated woddpeckers in eastern Oregon.
BIRD DENSITY
PP. 13, para. 2, lines 5-10. "Pileated abundance increased as the amou of forests with no logging, 60% or greater canopy closure andold growth increased."
"Density of snags 51cm dbh or greater was the best predictor of density of pileateds... The regressions onlogging activity, canmpy closure and successional stage also were significant."
HOME RANGE SEEE OF 7 PAIRS, PP. 13, para. 4, lines 2- (next pp.) para 1,
p.14.--"Home ranges averaged 407 ha./ 364 ha. were forested and the rest were openings."
OF NINE BIRDS WHOSE MATES HAD DIED
" PP. 14, Lines 2-6 ..."avgeraged 597 ha; an average of 540 were foreste One of these birds had a home range of 1, 464 ha, which was more than double that of ay other bird. If that bird was excluded, the home ranges averaged 489 ha, of thich 442 were forested."
Para. 2, lns. 1-3 Observed little or no overlap inhome range area betwe pairs, except where mate of one had died.
HABITAT WITHIN HOME RANGE
PP.15, para. 1, lines 1-4
"Habitat available within the home ranges was variable with size of home range. Smaller home ranges tended to have a higher percentage of area in grand fir, old growth, unlogged stands and stands with greater than o equal to 60% canopy closure."
para. 2, lines 1-2 " Pileateds did not use habitat within their ranges at random."
PP. 16, lns. 1-6, "They used stands with canopy closure 60% or greater, old growth, grand fir and no logging more than expected based upon availabilty, andall other types of stands less than expected."
para. 3, lines 1-8 "Of the foraging observations, 53% were excavating, 32% were pecking in bark, 10% were gleaning, and 5% were ~~perching~~

a combination of these. For all foraging observations, 38% were of pilleateed feeding on logs, 38% were of pileated on snags, 18% on live trees and 6% on stumps."
P.17, ln. 1-4 "Douglas fir and western larch were favored, lodgepole p: was avoided, andother tree species were used in proportion to their availabilty. Both logs equal to and greater than 38 cm dbh and long dead logs were preferred. P. pine, D. fir and w.larch snags were preferred. Snags greater than or equal to 38 cm dbh were preferred."
Para. 1 ln 1-7 Use ofdead standing trees and logs for foraging changed with the onset of snow, increasing the use of live trees (from 17%-22%) and in dead trees (from 35-55%) and a decrease in the use of logs from 41%-18% and stumps (from 7%-5%).
para. 3, lns. 5 -6. "Conner ('80) reported that pileated woodpeckers i Virginia used the oldest stands with the highest basal area and density of stems available for foraging." (Journal Field Ornithology 51:119-12
P.18, para 1, lines 1-12
Pairs in areas with mean snag densities of 3.1 snags/ha (greater than 2 cm dbh) did not successfully reproduce. Bull does not consider these low snag densitites capable of supporting a self-sufficient population. Areas with snag desity of 9.9 snags/ha (and 23% of them were 51cm dbh c greater and were self-sustaining and capable of acting as sources for other areas because of high density of pairs (5 and 7 pairs in the two areas).
MANAGEMENT IMPLICATIONS
P. 20, para. 1, lines 4-9 "From our findings, we now know that 121 ha areas are much smaller than ovserved pair home ranges and habitat compo nents other than snags are important for managing for pileated in easte Oregon. Management plans need to be revised to incorporate this new information."
para. 2 "We recommend using an average home range size of 364 ha of for more than three times the size of prescribed management areas. Within those home ranges we recommend that 75% be in grand fir type; at least 25% be old growth and the remainder be mature; at least 50% of the area have 60% or greater canopy closure; at least 40% of the area be unlogge and the remainder have partial overstory removal so mature stands are retained after logging."
Para. 3 Log density in 12 home ranges averaged 290/ha. 170/ha showed evidence of pileated feeding, tiwh a preference for logs greater than 38cm dbh, for long dead logs and for all species except lodgepole pine.
P. 21, para. 1 "The existing pileated management areas (121 ha) on National Forests are about 8 km apart. If only 1 pair of pileateds occurs in each management area for every 4,860 ha, then only 2% of the total forest is being mangged for pileated woodpeckers. In addition, observations in Spring and Wallowa (study areas) indicate that isolated pairs in marginal (ie. minimum standard) habitats are unlikely to susta: a population. This information suggests that larger blocks of habitat (for more than one pair) and in closer proximity should be managed for pileateds to provide self-sustaining populations."
Para. 2, (Conner, Wild Soc Bull 7:293-296) "Managing for minimum level of a species is risky. Consequences can be unfortunate when new data reveal that current reccommendations are inadequate to provide the population levels desired and because options have often been eliminated. Therefore, we reccommend managing clusters of 3 or more pairs in one block of habitat and blocks distributed across the landscape through time. This management should include the appropriate forest types, successional stages, logging activities, canopy closures, snag densitie: large diameter live trees and log densities within the larger home rang area."

5. Within the distri..'s planning documents it .s stated that standing dead and large material are being retained to meet 100% of potential population levels. Yet current Forest Service agency research has shown that snags need a 40% or greater canopy closure within the surrounding forest to be used by canopy dependent forest indicator species--such as the pileated woodpecker. Current research is also showing that these and other canopy dependent species need:

* seperate but overlapping territories such as with predator and prey--eg. canopy dependent goshawk from pileated woodpecker or pine marten--to avoid over predation and ensure species viability.
* 900 or more acres canopied late or old structure forest per pair for pileated woodpecker (with over 50% of this area being higher than 60% canopy closure) and maintaining a minimum of three or more nesting pileated pairs per watershed/subwatershed (to ensure species viability. As the home ranges of pileated pairs have little overlap, based on Evelyn Bull's research, managing for the minimum viability of this species would require 2,693.2 acres of mature and old growth forest habitat with over 1,346.6 acres of this consisting of greater than 60% canopy cover. (In addition, Bull et al. '92 caution "Managing for minimum levels of a species is risky (Conner 1979b). Consequences can be unfortunate when new data reveal that current reccommendations are inadequate to provide the population levels desired, and because options have been eliminated.")
* Pine Marten require mature and old growth conifer forests with 40 to 60% canopy closure (or greater). The home ranges of males can be from 2,300 to over 5,000 acres, and for females from 750 to 3,000 acres. Male marten home ranges overlap little if at all, and long-term viability rate is low if marten habitat areas are spaced as distant as two miles apart. (Clark '87, Buskirk and McDonald, Jones and Rapheal '90, Freel '91, Soule '86, Burke '82, Franklin '80, Koehler '90, Buskirk '89, Meslow '81)
* 956 acres of mature and old growth forests with greater than 40% canopy closure per pair of Black-backed woodpeckers, and 528 or more acres of similar habitat for Three-toed woodpecker pair (Goggan et al. '87 & '88, Bull et al. '86)(*these are <u>minimum</u> requirement figures for single nesting pairs only--and need to be multiplied by three or more pairs to ensure <u>minimum</u> species viability).
* Goshawk home ranges are generally from 5,000 to 8,000 acres--but can be as high as 10,000 to 17,000 acres (or more) in fragmented habitat. Goshawks require old growth forest nesting habitat with

greater than 60% canopy closure. Studies of goshawk population densities have found them to require a minimum of two miles between territorial goshawk pairs. (Reynolds '83, Crocker-Bedford '90, Austin '92, Flemming '87, Crocker-Bedford and Chaney '88, Hall '84, etc.) Again, enough pairs need to be provided for to ensure genetic viability.

--Consequently, we request a list of the scientific studies and district surveys upon which the above quoted claim of meeting 100% of potential population levels is based. To ensure validity these claims should addre

* cumulative impacts
* canopy closure
* species population variability
* viable genetic population requirements per species
* predator and prey species territorial disbursements and viabilit

6. We request a list of the agency and independent scientific studies a district surveys looking at the cumulative effects to riparian/aquatic habitat which substantiate the district's claim that the project(s) wil not impact individuals and/or species viability or habitat of the follo species: Redband Trout, Bull Trout, Blue Mountain Cryptochian, and Salmonid species. We also request similar substantiating information concerning all Proposed (C1 & C2), Endangered, Threatened, and Sensitiv species (flora and fauna) found within the project area. If the agency' responsive document is the Biological Evaluation, we request substantia ing surveys and studies upon which it is based, as well as the B.E. itself.

Thankyou for your compliance with this request within the time required by law.

For the Forests!

Asante Riverwind

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cc NRDC
Blue Mountains Native Forest Alliance
Central Oregon Forest Issues Committee
ONRC
KlahKlannie
IEPLC

Black-back-d Woodpecker

Exhibit 18

Regulatory Status:

Listed as a sensitive species in the critical catagory by the Oregon Dept. of Fish and Wildlife.
Listed as a species of concern in the monitor catagory by the Washington Dept. of Wildlife.
Listed as a management indicator species on the Wallowa-Whitman National Forest.

(The following information was extracted from: Status of the Black-backed Woodpecker in Oregon and Washington by David Marshall, 1992.)

Status, Range, and Habitat:

* Maintenance of black-backed and three toed woodpeckers "...may be tied to establishment of woodpecker management areas since these birds utilize almost exclusively mature and overmature trees which are infested with bark beetles, are diseased, have heart rot, and are in the early stages of decay." (pg. 8, 2nd para.)
* "...exempt areas (i.e. Woodpecker Management Areas) from commercial or salvage timber management..." (quoted on pg. 8, from: Goggans et al. 1987)
* "We suggest the minimum area used for managing habitat for a pair of black-backed woodpeckers as 956 acres (387 ha) (from 478 acres per woodpecker) of lodgepole or lodgepole pine-dominated habitat in mature or overmature condition." "Fragmentation should be minimized to the extent possible, so that the 956 acres are contiguous or at least interconnected." (ibid, pg. 8, quoted—originally from Goggans et al. '87)
* "...its diet is largely bark beetle larvae which are reached by flaking bark chips from tree trunks. It therefore thrives under conditions which produce a source of this food: specifically fire, wind, or insect killed mature or over mature pines, and other trees which have flaky bark. It also requires trees having heart rot for nesting and deformed conditions for roosting. Silvicultural practices...harvesting trees...susceptible to bark beetle attacks and salvage logging of beetle-infested or killed trees is therefore counterproductive to maintaining the species. (pg. 11, 2nd para.)
* "...bark beetles also infest trees for a period of several years after they have been killed by fire." "Salvage logging, which immediately follows a fire, removes a potential food sourc (pg. 8, last para. & pg. 9, 1st para.)
* The Washington breeding bird atlas project located black-backed in only 18 of approx. 2,000 blocks covered statewide. (summary pg. iii, 2nd para.)
* No sufficient protection on National Forests—which comprise the greatest share of habitat. (summary, pg. iv, para. 3)
* Black backed feed primarily on the larvae of wood boring beetles of the families Cerambycida and Buprestridae. Other food taken includes other beetles, weevils, ants, other insects, and spiders. Fruit and vegetable matter comprise less than 12% of their diet. (pg. 2, last para. (from Bent, 1939).
* "...have a reputation for responding to bark-beetle outbreaks in recent fire-killed forest stands or where trees become susceptible to bark-beetle attacks through maturity. (pg. 2, las para., from Blackford 1955). (also discussed by Crockett and Hansley, 1978).
* "Studies by Goggans et al. (1987, 1989) in Central Oregon during a mountain pine beetle (Dendroctonus ponderosae) epidemic suggested this woodpecker fed almost exclusively on the larvae of this beetle. (pg. 3, 3rd para.)

Picoides arcticus

Description: solid black back, barred with black on flanks and sides, wings barred with black and white, underparts white, tail black with white outer feathers, males have a yellow patch on the top of the head. Call a sharp "kyik"—similar but flatter than hairy woodpeckers.

* Black-backed in the Blue Mountains of Oregon were observe exclusively on live and dead trees as opposed to some of the other woodpeckers who used logs and stumps. (pg. 3, 4th para., from Bull et al. 1986).
* Nests--A new cavity is excavated each year, nests are susceptible to takeover by other woodpeckers. (pg.3, 5th para., from Goggans et al. '87).
* No use of logged stands detected in 395 foraging bouts observed. All three radio tagged birds selected for mature and old growth trees against young stands. (pg. 5, 5th para., from Goggans et al., '89)
* Although nests in smaller dbh trees (mean dbh of 15 nest trees at Starkey, in E. Oregon, was 14.6 inches--Bull et al. '86), "...birds selected for mature and overmature sawtimber stands over younger stands." (pg. 6, para. 3 & 5, from Goggans et al. '87).
* "...selection for multistoried stands over single-storied stands was found." (pg.6, 5th para., from Goggans et al. '87)
* Canopy closure in nest stands in Northeast Oregon was over 40%. (pg. 6, para. 6, from Bull et al., '86).
* Mature and old growth trees were selected for roosts, including trees with deep trunk scars, indentations, concave western gall rust cankers, and a mistletoe clump. Diseased or deformed trees may be important components in black-backed habitat. (pg. 6 & 7, last and first para. respectively, from Goggans et al. '87).
* "The best estimate of the area required to support a single black-backed woodpecker according to Goggans et al. ('87) was 478 acres (193 ha) of which 59% was described as being in mature to overmature condition." (pg. 7, para. 6).
* No overlap in summer in home ranges between non-mates. The birds defended their home ranges against other black-backeds. (pg. 7, para. 7, from Goggans et al. '87).
* The larger home ranges had the highest proportion of logged sites. (pg. 7, para. 8, also from Goggans et al. '87).
* Insectivorous species like the black-backed are a means of biological control of insects which damage trees. (pg. 8, para. 5, from Takekawa et al. '82).
* Tracts established for other indicator species are not necessarily in areas used by black-backed woodpeckers. (pg. 10, 1st para.)
* Unless habitat blocks are located within dispersal range for young black-backs, they are ineffective. (pg. 10, para. 1).
* Much of the designated old growth habitat set aside for old growth dependent wildlife species may constitute tracks which are too small to be utilized by this species, especially if under home range minimums of 956 acres per pair, or for other reasons including elevations or tree species compositions outside the black-back's habitat range. (pg. 10, para. 4).
* Snag retention formulas utilized by the agency may be ineffective in adequately providing for black-backed woodpeckers for two reasons: 1. snags provide more than nesting habitat; retention is unlikely to occur in sufficient amounts to provide adequate feeding substrate for species dependent upon wood-boring insects in trees with flaky/scaly bark, and 2. such an approach addresses only one component of this canopy/old growth/fire and disturbance dependent species habitat. (pg. 10, para. 7 & 8, from Goggans et al. '86).

White Headed Woodpecker** Picoides albolarvacus

In central Oregon study, foraging on ponderosa pine having a dbh of 20+" (Matthews '90)
Nest snag range 9-39" dbh w/ a mean of 18" (Matthews '90) (based on a 13 nest survey).
Two radio collared birds had home ranges of 250-500 acres. (Matthews '
In central and south Sierra Nevada, CA, nests were in open stands of mature and over mature trees w/ 40-69% canopy closure. Mean dbh of trees was 28.7" and range was 8.3-74.8". (Milne '89)
Reasons for sensitive status-- "Apparent need or preference for large ponderosa pines that are being cut and replaced by young pines, combined with sparce natural population of the species. Snag loss als impacts this species." (Marshall '92, "Threatened and Sensitive Wildlife of Oregon's Forests and Woodlands" P.49)
Research/Survey actions needed: "Population surveys in all forests. Population monitering etc....."
Primarily birds of mature ponderosa pine forests, white-headed woodpeckers require large, decayed snags and forage mainly on large ponderosa pine trees in the puzzlebark stage (greater than 60 cm. or 24") (Jackson & Scott '75, Thomas '79, Lang et. al. '80)
White headed woodpeckers during winter, feed heavily on seeds from unopened pine cones. (Ligon '73)
" Ponderosa pine does not produce heavy seed crops until 60-100 years of age (Lang et. al. '80)" WA Dept. of Fish and Wildlife, May '91. "Management Recommendations for Washingtons Priority Habitat's and Species"
In Northern CA the diameter range of 11 nests trees was 41-97cm (16-38 with a mean dbh of 65 cm (25") (Raphael and White '84)
This species has low versatility because of its primary association in Washington with only two forest types and stand conditions. (Lang et. al. '80)

Management Recommendations

"White headed woodpeckers require mature (especially ponderosa pine) forests for survival...Large trees should constitute 40-70% of the forest canopy (Neitro et. al. '85)" WA Dept. of Wildlife '91
Conner ('79) notes that managing for the minimum habitat components may cause gradual population declines. Instead he suggests using average values. Thus the mean dbh of 65 cm (26") is preferred and additional livetrees should be left for feeding." WA Dept. of Wildlife
WA Dept of Wildlife '91, para. 2
"Woodpeckers.... (Takekawa et. al '82) and other insectivores play an important role in reducing insect populations at endemic levels- othe benefits of biological control."
(Tities of refs. in WA Dept. of Wildlife under "W" and Marshall "Threatened and Sensitive..." p.50)

Exhibit E

Northern Three Toed Woodpecker - Picoides tridactylus

*** Three toed selects for mature or old growth lodgepole pine. [Deschutes National Forest Study, Goggans et. al. '87]

*** In Oregon the three toed feeds mainly on wood boring insects on lodgepole pine or engleman spruce. [Deschutes N.F. Study, Goggens et. al. '87]

*** In Deschutes N.F. found to roost mainly in snags in dense unlogged stands of lodgepole pine or mixed conifer with lodgepole pine. [Goggans '87]

*** Home range for radio collared birds were 131, 351 and 751 acres. [Goggans et. al. '87]

*** Reasons for sensitive status - General rarity. Removal of mature and insect infested timber from otherwise suitable habitat. Conversion of mature and old growth into young and fast growing stands that are relatively free of heart-rot and bark beetles, as now practiced to control bark beetle outbreak in lodgepole pine stands on the east slopes of the central cascades. [Goggans '87]

*** Goggans recommended establishment of management areas in over mature and mature lodgepole and lodgepole pine mixed conifer stands that would be exempt from commercial or salvage harvest. Such areas would entail 528 acres per pair at minimum elevations of 4500 ft., but this acreage was based on a study coordinated during a bark beetle outbreak. Areas of greater size may be required under normal conditions. [Goggans '87, from the OR Dept. of Fish and Wildlife, Sensitive Vertibrates of Oregon, 5-21-91]

*** They are dependent upon old growth lodgepole pine for nesting found to excavate cavities in dead or occasionally live lodgepole pine stands having heart rot and a mean dbh 11" (more than 8" is considered old growth in lodgepole pine. [Goggans '87]

More research needed to determine population status/viabilty in OR. [Marshall '92 "Threatened and Sensitive Wildlife of Oregon's Forest and Woodlan p. 52]

Exhibit F

Pine Marten *** Martes americana

The following information was extracted from a "Declaration on the Effects of the Land and Resource Management Plan of the Winema National Forest, Oregon, on the Marten and Its Habitat" written by Marshall White. (April 1992)

Habitat Requirements

*** Martens depend upon dense, mature and old growth conifer forests. (p.2, 2nd. para. - Raphael and Jones '91, Koehler '90, Buskirk '89, Meslow '81)

*** Martens occur in smaller numbers in middle and later successional forest stages and in some small meadows in non-snow season but winter survival of viable populations is usually dependent upon readily available mature and old growth forest and its extent and quality. (p.2, 2nd para, Rapheael and Jones '91, Koehler '90)

*** Important habitats include lodgepole pine, mountain hemlock, mixed conifer and ponderosa pine usually at elevations above 4,000 ft. but some important habitat and populations are lowland. *(p. 3, line.8, Schempf and White '77)

*** Avoid large clearcuts and burns and other openings. (p.3, para.3, Buskirk and Powell '91, Grinnell '37)

*** Require an abundance of dead wood and structural diversity. (p. 3, para.3 Corn and Raphael '91, Clark '87, Allen '84)

*** Hollow snags must be present as well as hollow logs and stumps, for rearing young and resting, especially in winter. (p. 3, para. 3, Clark '87, Strickland and Douglas '87, Martin and Barrett '91, Spencer '83)

*** Dead wood should cover 20-50% of the forest floor. (p.4, line 21, Allen '84)

*** Snag, stump and log density and diameter (2 estimates):
19 snags, 27 stumps and 16 logs all over 30"dbh per acre (Martin and Barrett '91a)
41 stumps, 121 logs and 52sq. ft. basal area snags per acre. (Spencer '83) (p.11)

*** Require 25% or greater conifer tre
(From WA Dept of Wildlife, Marten Report Allen '82)

*** In winter Martens select dense cover extending 9ft. or more above the snow. (OR Dept. of Wildlife, Marten Report, Forest et. al. '89. Jones and Raphael '90, Martin '87)

*** Typical nesting snag requirements include old growth fir snags of 40"± 9"dl in summer and winter. Mistletoe clumps nested in too. (OR Dept. of Fish and Wildlife, Marten Report, Spencer '81)

Corridor and Canopy Requirements

*** "Riparian corridors or other travel corridors are necessary to Martens to provide safe and frequent movements throu poor habitat areas and between habitats. All of these travelways should be dense multi-storied stands, have a minimum canopy closure of 50-60% and; if not riparian, should be located through saddles , passes and along ridges." (p.4, Maser et. al. '81, Freel '91)

*** Long term viability rate is low if Marten habitat areas are spaced as distant as 2 miles apart. (p. 12, Freel '91, Soule '86, Burke '82, Franklin '80)

*** Freel ('91) recommends over 60% canopy closure for travel corridors and widths of 300 ft. when within mature forest stands and over 600 ft. when adjacent to open areas or those with little canopy. (p.13, para. 3)

*** Management by small stands and patches fails. (Harris '82, Fisher '89, Bissonette '89, Irwin '87, Clark '87)

Canopy Requirements

*** Martens require dense forest with 50% canopy in winter and 30-50% canopy in the non -snow season. However, they use the areas with less canopy in lower densities (population). These areas are important when they occur adjacent to mature and old growth stands. (p.3, para. 3:Clark '87, Strickland and Douglas '87)

*** Martens select toward areas or stands with 40-60% canopy. (From OR Dept. of F.W., Marten Report, Hargis '82, Spencer '81, Barrett and Zielenski '83)

In Western Washington, martens preferred areas with 71% canopy closure. (WA Dept. of Wildlife, Marten Report, Jones and Raphael '90)

Home Range Requirements

*** Male home ranges average about twice the size of female ranges. (p.5, para. 2, Buskirk and McDonald '89)

*** Home ranges of individual adult males usually overlap little if at all, while female ranges frequently overlap with one or more female. Study also says that female ranges overlap with male ranges. (p. 5, para. 2, Strickland '82)

*** Home range size expands if habitat deteriorates or prey numbers fall. (p.8, para. 3, Harlow '91, Zielinski '91)

*** Home range estimates:
- 1312 acres male, 808 acres female (Freel '91)
- 500-700 acres male, 250 acres female estimated by doing a literature review of few catch and release studies. (Clark '87)
- 2,400-4900 male, 750-1500 female (acres) done by reviewing all of the telemetry studies. (Clark '87)
-300-4,000 male, 250-3,000 female (acres) (Buskirk and McDonald)
- 2,288-5,386 male in WA (in WA Dept. of Wildlife Marten Report, Jones and Rapheal '90)

*** 160 acres is to small for female survival year to year. (p. 8, para. 3, White '92)

*** There are limits to a small fixed habitat area, such as long term population viabilty not being sucessful. (p. 14, para. 4, Irwin '87)

*** Martens rarely select sites more than 1,300 ft. from meadows. (O.D.F.W., Marten Report, Hargis '82, Spencer '81, Barrett and Zielenski '83)

*** Coast range and North Cascades may no longer support viable population. Marten most common in S. Cascades and Blue Mountains. (O.D.F.W. '91)

*** Grazing by livestock has caused serious depletion of marten habitat... by impacting native vegatation, thus reducing prey species. (Strickland et. a '87)

Exhibit G

4. GREEN TREE SNAG REPLACEMENT

Snags and large down woody material (LDWM) are pivotal issues in the eastside screening process. The third (wildlife) screen is designed to maintain options for future wildlife habitat requirements for old growth-dependent species. There are several major problems that are not adequately addressed in the Screens EA. The programmatic direction, in the EA, for forest managers to maintain snags and green replacement/roost trees of $\geq$ 15 inches dbh at 100% potential population levels of primary cavity excavators is currently being applied on the ground in a wildly variable manner from forest to forest and even from district to district.

The reason this issue is critical is that each Forest is now interpreting the green tree requirement in a different manner and how they interpret this will create a much different economic and environmental scenario. If the Tonasket method was used across the Forests it would allow up to 64 more trees per acre to be logged than the Wallowa Whitman Green Tree Snag Replacement Guidelines! Obviously this would create a very different economic scenario - but this is not analyzed in the EA. in fact no information is available that indicates the Decision

Maker even considered or noticed this problem. NEPA at 40 CFR 1502.14(a) requires the agency to "rigorously explore and objectively evaluate all reasonable alternatives". Appellants contend this was not done and cannot be done until the Decision Maker knows how each District on every Forest is applying the screens.

The standard for snags and down logs are set at minimum levels of consideration. EA at B-8. Adherence to the standard is only possible if a clear, consistent application is made regionwide. NEPA requires the use of accurate modeling, based on up to date scientific information, supported by credible research. The following specific wildlife prescription is to be used (EA at B-8 and 9):

All sale activities (including regeneration, select cutting, thinning, or salvage) will maintain snags and green replacement/roost trees of greater than or equal to 15 inches dbh at 100% potential population levels of primary cavity excavators. (This should be determined using the best available data on species requirements as applied through current snag models or other documented procedures.)

Each Forest within the Region should use a snag/green tree model that meets this criteria, but this is not currently the case. For example, the Colville National Forest has determined that 10 to 12 green trees greater than 10 inches will meet the goal of maintaining 2.25 snags per acre through a rotation. (Meeting with Colville National Forest Supervisor and Wildlife Biologist, April 1994). The Okanogan National Forest, Tonasket Ranger District believes that only two green replacement trees are needed for every snag. Since the Tonasket RD has determined 3 snags per acre are needed they will provide 6 or 7 green tree replacements per acre. (Communication with Silviculturist Don Rose, May 1994).

On the Wallowa-Whitman National Forest, the Green Tree Snag Replacement Guidelines have been created, through extensive analysis and modeling, that a range of 38 to 70 trees per acre are needed, depending on species, size, and plant communities. (Wallowa-Whitman Green Tree Snag Replacement Guidelines). In order to fulfill the intent of NEPA a resolution of the large discrepancy in methodology must occur. NEPA at 40 CFR 1502.24 states that:

> Agencies shall insure the professional integrity, including scientific, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit references by footnote to the scientific and other sources relied upon for conclusions in the statement.

The appellants believe that the Wallowa-Whitman model is the only scientifically based methodology and that it must be the basis of a green tree snag replacement standard. This model is based on the research of Jack Ward Thomas and Evelyn Bull, while at the Forestry and Range Sciences Laboratory in La Grande, Oregon. Since the Wallowa -Whitman guidelines were adopted new research from Bull indicates that cavity excavators actually require 3 to 5 snags per acre, and that snags greater than 15 inches are used almost exclusively.

A process for determining green tree snag replacements on any Forest was developed by the Wallowa-Whitman National Forest in November 1993, and sent to the Regional Office at that time (Determining Green Tree Snag Replacements: A Process Paper). Assumptions for the model and a strategy for tailoring the model to different forests were presented. Site specific conditions, species mix, tree mortality, snag fall rates and green tree growth rates will vary somewhat from Forest to Forest.

The appellants contend that the methodology used by the Okanogan, Colville and other forests is flawed, and that the only model that could pass scientific scrutiny (as required by NEPA 40 CFR 1500.1(b))is the Wallowa-Whitman model, with modifications to include new scientific information on cavity nester needs. One indication that a standard methodology for green tree snag replacements are needed is that the Colville National Forest Supervisor recently released (6-17-94)the Whiteman Timber Sale Decision Notice calling for retention of 16 large green trees per acre to provide for future snags. While this is a move in the right direction, it shows that the Colville NF has no consistent model for green tree snag replacement.

Snag creation and use of artificially created snags by cavity excavators is still an uncertain science. The appellants contend that unless a specific schedule for continual monitoring snag densities and snag creation is budgeted the induced mortality option is not a viable alternative.

It is important to keep in mind during the following discussion that Evelyn Bull s latest research indicates that 2.25 snags per acre is inadequate and that the number that we should be looking for is more likely somewhere between 3 and 4 snags per acre. Green tree replacement numbers should be adjusted upward accordingly. Also the Wallowa-Whitman green tree snag replacement guideline assumes a 90-year rotation which is inadequate to produce old growth.

If the Forest Service is to maintain 2.25 snags per acre over 10 inches in diameter there need to be green tree replacements available in each area since the average ponderosa pine snag persists only for about ten years. In fact there need to be several green tree replacements for each snag since snags need to be replaced every ten years and since it takes about 60 years to grow a ten inch tree to replace the smaller snags on a site. There need to be about 6 times 2.25 or 14 replacements waiting in the wings. Since these replacements do not die as fast as they are needed, however, more trees need to be left in the stand in order to provide the 2.25 snags per acre through natural mortality. Since only .6 percent of the trees will die each year through natural mortality a ponderosa pine site must retain approximately 70 live trees per acre greater than ten inches in diameter. In many areas on the eastside this is a fully stocked stand.

Size is another factor that is involved here as well. If the stand is only one size class which is generally over 20 inches in diameter then the number of replacements that are required falls to 44 per acre but they must all be over 20 inches dbh.

We have seen the Forest Service propose various schemes to create snags from green trees in some stands to meet the replacement guidelines. Snags are typically created by either girding the base of the tree, cutting the top off of the tree or dynamiting the top of the tree. Girding the tree creates a snag that does not stand for an acceptable length of time. Of the other two alternatives dynamiting the top of the tree seems to be both safer and creates a more useful snag. Although only about 18 green tree replacements are required for 100% of Thomas if created snags are used, it appears that snag creation is prohibitively expensive. For example assuming a snag creation cost of $60 per tree it would cost between 1.12 and 1.55 million dollars a year to use a program of 100% induced mortality on the Wallowa-Whitman. This would represent a doubling of the timber stand improvement budget and would be too expensive to implement.

There are other problems with induced mortality as well. In a recent conversation with Evelyn Bull she indicated that her latest research indicates that it may be necessary to maintain up to 100 down logs per acre to preserve adequate ant populations and pileated feeding habitat. There are several significant questions that the Screens EA does not adequately answer.

Is induced mortality an option for green tree replacement and from where will the funding for induced mortality come?

How will we get 100 down logs per acre out of 18 trees? Is the newest research which indicates that 3-4 snags per acre are necessary to maintain pileated populations the best available data on species requirements as applied through current snag models or other documented procedures referred to in the Screens EA?

What is the regional direction implied in the Screens EA regarding rotation ages, and how does this apply to green tree snag replacements.

Until these questions are answered the Decision Maker, and Public cannot tell what the ecological and economic impact of the proposed alternative is, and the requirements of NEPA are not being met.

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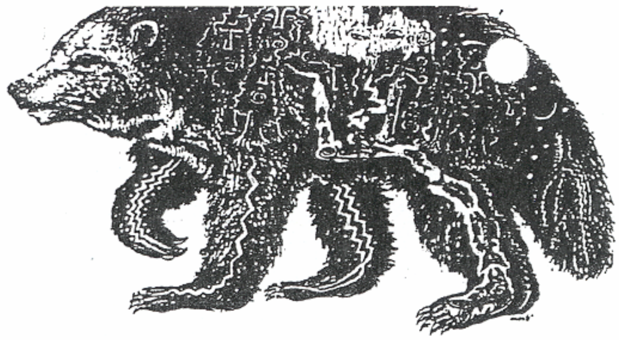


Small mammals play a vital role within natural ecosystems. As prey species they are food for raptors, including goshawk, great grey owl, pygmy and flammulated owls, and peregrine falcon, among others. They also help provide sustenance for coyotes, badgers, wolverine, cougar, and pine marten. They break open cones, spread seeds, redistribute indigenous plants over disturbed areas, and inoculate trees with mycorrhizal fungi. Their role in the food chain is immense and irreplaceable. Within the living soil, which has been suggested as a prime indicator of ecosystem health, they play an essential role within a complex mix of interacting organisms ranging from bacteria, fungi, nematodes, and arthopods to ground squirrels, pocket gophers, marmots, and badgers. For the soil's vital nutrients to become available to plants and animals, they must be mineralized by the innumerable interactions of these many diverse species of decomposers and their predators. The stability and viability of natural ecosystems depends upon the many important roles of its native species, including its small mammals. There are no substitutes for the many functions they serve.

Pocket gophers are a beneficial component of a healthy ecosystem. Not coincidentally they are found in areas damaged by logging activity or recovering from natural disturbance. Mounds of bare soil formed by the activity of pocket gophers has been demonstrated to be an important substrate for seedling establishment (Hobbs and Mooney 1985; Koide et al. 1987). Their presence has a significant effect on the diversity of the ecosystem they live within (Coppock et al. 1983; Collins & Barber 1985; Huntly & Inouye 1988; Whicker & Detling 1988; Martensen et al. 1990). Pocket gophers are primary burrow excavators, upon whose tunneling activity many other species depend. Pocket gophers aerate soil, alleviating compaction from

Pocket Gophers

Thomomys mazama
Thomomys townsendii

heavy machinery. They act as soil forming agents, aid in water conservation and bring to the surface soils from below ground that hold important micro-nutrients. Their burrowing activity also spreads mycorrhizal fungi, helping to inoculate seedlings and improving the seedlings' chances for survival. Their uneaten vegetation decomposes readily below ground, providing fertilizer for the soil. Their burrows and tunnels circumvent runoff in eroding areas and on compacted soil where water does not easily infiltrate the soil. And, they are part of the food chain.

Regeneration failure is most often caused by soil compaction, nutrient depletion and related site problems resulting from livestock grazing, operation of mechanical equipment (eg: skidders, bulldozers, fellerbunchers, and logging trucks), removal of overstory shade and protection (from logging) and planting of containerized stocks of trees. Containerized trees do not spread their roots out in the manner of naturally seeded trees. This is related to a high mortality rate among seedlings. Additionally, grass seeding in the aftermath of either logging or fire can result in changing the area's subsoil microbial communities to those which favor grassland vegetation, making tree regeneration extremely difficult. Further, replanting logged forested areas as even-aged plantations with large numbers of seedlings does little good for long-term forest health. In the aftermath of logging disturbance the compacted exposed soils may take years (to decades or longer) to be fully capable of sustaining large numbers of healthy trees. Many species, including pocket gophers, play a vital role in restoring a logged areas capability to support a viable forest. The often high seedling mortality frequently found within replanted logged areas is related to a complex weave of many diverse interacting factors. However, in the long run, the failure of areas to regenerate as a tree "plantation"--lacking the diversity of species and age range of a natural forest--is in the best interests of the region's recovering forest health. To this end, any role pocket gophers may play (however minimal it in all probability is) in the regeneration "failures" of even-aged plantations, is in the long-term best interests of the recovering forest itself. Such purported "failures" should serve as a warning to the proponents of such logging and replanting that their methods are out of balance with natural processes and therefore unsustainable.

Other factors rarely considered in practice, although frequently considered in research, include failure to regenerate on sites that should never have been logged in the first place. Regeneration failures commonly occur on sites with poor, rocky or shallow soils, steep slopes, areas which have been logged repeatedly, places suffering from drought, and most significantly--areas impacted by cattle grazing (as well as sheep or other livestock). Cattle and other livestock destroy seedbeds, dump ammonium and phosphate--not compatible with seedlings--on the ground in their urine and feces, chomp young seedlings, trample, kill, and over-eat native vegetation, compete with indigenous ungulates, cause soil compaction, erosion and sedimentation, destroy water quality and anadromous spawning habitat and are <u>not</u> a natural part of the ecosystem.

When livestock grazing is often the primary impediment to regeneration of young seedlings, why is the Forest "Service" engaging in poisoning gophers (as well as "non-target" species)? Removal of livestock is an obvious and essential part of the solution. "Animal Damage Control" should begin with livestock removal. Additionally, the activities which make replanting and regeneration "necessary", ie: excessive and harmful industrial timber harvest, should be stopped.

Strychnine and other toxic bait poisoning is very dangerous. In the Nov. 1994 E.A. for the Cabin Fire Recovery the Bear Valley Ranger District of the Malheur National Forest states: "Unexplained cases of strychnine poisoned raptors have surfaced on or near the Willamette National Forest in recent years. If a poisoned gopher were to begin convulsing while above ground the erratic movements would likely attract the attention of any predators or scavengers in the vicinity. This can lead to secondary poisoning of non-target species." Additionally, the terrestrial science team of the Interior Columbia Basin Ecosystem Management Project has found that there have been cases of poisoning for gophers or other small mammals that have resulted in secondary poisoning of scavengers feeding on carcasses.

Considering the danger that raptors and other non-target species will be poisoned, including those that are proposed (C-1 & C-2), endangered, threatened, or sensitive listed, ("PETS" in agency jargon) poisoning projects should not be permitted. Gophers are the primary staple of the badgers diet, as many studies have demonstrated. However, obviously a badger cannot fit down a gopher hole. Badgers hunt gophers by digging them out of their burrows. They would be in extreme danger of being poisoned. Further, strychnine can last for up to 30 days (at least). To date there has been no successful precedent for funding required for any district to thoroughly monitor all of the poisoned areas to be certain that secondary or primary poisoning of non-target species doesn't occur. Considering again, many predatory birds carry gophers off-site to digest them or feed them to their young--observance of these casualities is extremely improbable. Species that may be poisoned by eating poisoned gophers include wolverine, goshawk, pygmy and flammulated owls, peregrine falcons, eagles, great grey and great horned owls, pine marten (and in some parts of the N.W. fisher), as well as cougars, bobcats, and badgers among others.

Pocket gophers are known as a primary burrow excavator species. This means other species utilize the burrows it excavates. Poisoning programs are indiscriminate in pinpointing just which species is occupying which gopher burrow. If a burrow has food in it, it will likely attract the sensitive nose of other foraging small mammals. These animals are adept at finding food and the deceptive "food" of poisoned bait would prove fatal. The full extent in which strychnine or other poisons may travel through the food chain, given a 30 day or longer lethal period, may never be known. Looking at the full range of the many species potentially impacted, it becomes astounding. From carrion beetles, ants, and other invertebrates, bacteria, nematodes as well as the many species which prey upon these--insect eating species such as snakes, lizards, birds from grouse to neotropical migrants--all are in some form of danger. Not all levels of poisoning kill outright. Lower levels of ingested toxins may affect behavior, vigor, vitality, and judgement, sometimes resulting in the ingesting predator or scavenger becoming vulnerable as prey itself, or potentially affecting its reproductive capabilities.

"The rich nutrient reservoir in forest soils can be lost or depleted in several ways: by removal of the timber itself during logging; by the compaction caused by the use of heavy equipment during logging and road building, which destroys the microorganisms in the soil and causes the nutrients they contain to be leached out; by erosion, which transports soil nutrients out of the watershed; by exposure caused by removing vegetation that casts shade, retaining a relatively humid atmosphere and preventing the soil from becoming too hot for survival of micro-organisms; and by the practice of tree monoculture, particularly when herbicides are used to suppress competing vegetation." [Gordon Robinson, Excellent Forestry, Island Press 1988. p.89]

"As many as 70 different species have been collected from less than a square foot of rich forest soil. The total animal population of the soil and litter together probably approaches 10,000 individuals per square foot." [Ibid., 87]

"Compaction contributes greatly to the reduction of soil quality by destroying large numbers of microorganisms, thus permitting the nutrients they normally store in their bodies to be released into the soil as leachable solutes. In addition, their decreased number reduces the rate at which insoluble minerals are converted into soluble substances that plants can use. Compaction also reduces the ability of the soil to absorb water. When rain falls or snow melts on compacted soil, the water runs off instead of soaking into the earth, so compaction causes erosion as well." [Ibid., 90]

Salvage logging removes potassium, calcium and magnesium from forest soils. "The potassium cycle (in the soil) is relatively simple, but this element is not available to plants until it is converted to water soluble compounds by bacteria, mycorrhizae, and possibly other organisms... Potassium is lost from forest soils mainly when it is leached out by erosion and when wood is removed from the land by logging."[Ibid., 80]

"Calcium and magnesium are widely distributed in the earth...and are essential to both plant and animal life but are available to plants only in soluble compounds... In nature, they are recycled adequatlely in most ecosystems. However, in situations in which crops are removed from the land, their cycle is broken. Unless measures are taken to minimize losses, and either to limit harvesting to match the natural rate at which calcium and magnesium can be derived from inert minerals or to artificially replenish them, the soil will become impoverished over a period of time." [Ibid., 89]

"Research conducted in Japan and reported in 1971 by Hidenori Nakano revealed that erosion sharply increases in proportion to the amount of forest cover removed...Erosion increases exponentially with...a linear increase in runoff, so doubling the runoff results in a fourfold increase in erosion." [Ibid., 92]

"Management practices can drastically affect abundance and species compostion of the small arthropoda that regulate soil microstructure and elemental recycling." [Moldenke]

"Commercial harvesting...disturbs soil horizons (Harvey et. al. 1994) and associated microfauna and fungi that play vital roles in ecosystem processes such as nutrient uptake, disease resistance (eg., microhizae conferred resistance), mycorrhizae dispersal, and decomposition (Shaw et. al. 1991, Niemela et. al. 1993); [and] removes from the system significant quantities of nutrients, minerals, and trace elements that have been sewuestered over eenturies and retained in the biomass through slow decomposition (Harrey et. al. 1994)." [D.A.. DellaSala et. al. in Ecosystem Management and Biodiversity Conservation: Applications to Inland Pacific Northwest Forests. 1994]...

"The cumulative impacts of multiple entries into watershed areas and soil compaction resulting from the heavy logging equipment, road building, and helicopter landing platforms to access logging units can be as severe as the more intenaive forestry methods (Harvey et. al. 1993, per. comm. J. Belsky, Oregon Natural Resources Council, 1994). Moreover, thinning, pruning, and salvage operations if conducted at landscape scales to accomplish forest health objectives (see Lippke and Oliver 1993, O'Laughlin et. al. 1993, Everett et. al. 1993, Sampson and Adams 1993) will likely damage sensitive soils, remove coarse woody debris from the system, and present additional stresses to vulnerable species." [Ibid., p.11]

"The common practice of using heavy equipment for harvesting and preparing sites on relatively flat ground is well known to compact soils and reduce their fertility... In my opinion the practice should be abandoned immediately."[David Perry Senate Field Hearing on Forest Health, 1994]

"Subsoiling bares soil, forms channels, makes soil particles more easily detachable, and disrupts roots, thus raising the risk of erosion for a few years." [statement of Soil Scientist, Robert McNeil, USDA Forest Service, Malheur National Forest, in the Officer T.S. Analysis File, Bear Valley R.D., 1994]

"Even with helicopter logging (the least disturbing method [in the study]) 12% of the logged area soil was distrubed. Conventional tractor systems disturbed almost 75% of the area and caused erosion on over 30% of the area (Klock 1975). Other studies have demonstrated adverse soil structure effects from logging that increase erosion (Steinbrenner and Gessel, 1955) and reduce reforestation success (Garrison and Rummell, 1951). Dyrness (1972) and Woolridge (1960) evaluated effects on soil from logging with low impact systems (balloon and skyline). Both researchers noted damage to the soil. None of the studies noted any beneficial effects to the soil from logging." [Timothy Sexton, Masters Student, Dept. of Rangeland Resources, Oregon State University]

"Compaction, displacement and increased susceptibility to frost heave (through microclimate changes) are a few of the effects that can reduce deedling survival and growth (Harvey, et. al., 1989). [Ibid., p.12]

"The balance of forest-soil organisms can shift dramatically in response to chemical, environmental and biotic factors caused by natural disturbance or management related activities such as timber harvest, site preparation and fertilization (Perry and Rose 1983, Amaranthus and Perry 1984). Although some soil organisms thrive in the aftermath of disturbance (Pilz and Perry 1984), those that cannot compete may decline, lose vigor, or disappear altogether (Perry et. al. 1983, Harvey et. al 1986, Amaranthus and Perry 1987). The final equilibrium of soil organisms may or may not facilitate rapid reforestation for sustained conifer growth. [Amaranthus, Trappe and Molina, Long-term Forest Productivity and the Living Soil. 1989]

"In ecosystems with predominantly nutrient-poor soils, addition of nutrients can consitute a major disturbance, which has been shown in many examples to facilitate invasion by non-native species. Huenneke et al. (1990) have shown that a serpentine grassland dominated by annual forbes can be transformed in two years into one dominated by non-native grasses by the addition of nutrients, particularly nitrogen and phospherus. Hobbs et al. (1988) produced similar results and showed that survival of non-native grasses was significantly enhanced on fertilized plots, while that of native forbs was reduced...Hobbs et al. (1988) found that subsequent gopher disturbance actually reduced the dominance of non-native grasses and allowed the re-establishment of native forbs." [Hobbs and Huennéke, Disturbance, Diversity and Invasion. Conservation Biology, V.6, no. 3, 1992. p. 331]

" Humus, rotten wood, and the upper mineral soil are the powerhouses of soil biological activity (Harvey et al. '79, '86) and thus are essential substrates for maintaining forest productivity."[Amaranthus, Perry and Molina 1989]

"Most woody host plants require soil organisms to facilitate adequate nutrient uptake. Mycorrhizae enhance such uptake not only by increasing surface area of roots but also through active physiological mechanisms." [Ibid.]

"Maintenance of long-term forest productivity requires lont-term conservation of nutrient capital. Few nutrients leach out when populations of soil organisms are healthy and active."[Ibid.]

"Both symbiotic and free-living soil organisms can protect trees against soil pathogens. Several mycorrhizal fungi protect pine (Pinus) species and Douglas-fir from pathogens such as Phytophthora cinnamomi, Fusarium oxysporum and Rhizoctonia solani (Wingfield 1968, Mark 1973, Mark and Krupa 1978)."[Ibid.]

"Minimizing soil compaction helps maintain healthy populations of soil organisms by preserving soil structure. Pore space is essential for the movement of oxygen and water into soil and the flushing of carbon dioxide out of it; microbial activity is drastically altered when levels of these basic elements become extreme. Undisturbed forest soil is rarely saturated because large pores allow for rapid downward percolation of water. However, when soils are compacted, large pores are destroyed and water movement through the soil is reduced."[Ibid.]

"Woody debris is a dynamic component of the forest soil. It provides a storehouse of moisture and is an energy source and refuge for microorganisms critical to forest productivity. Mycorrhiza activity is significantly greater [as it] occurs in decaying wood than soils (Harvey et al. 1979). The relative importance of woody debris in supporting feeder roots may be more important on dry sites than on moist sites. During periods of adequate moisture, humus supports the highest level of ectomycorrhiza activity; but during periods of drought, soil wood becomes the most active site (Harvey et al. 1986)." [Ibid.]

"On cold, droughty, nutrient-poor, or otherwise stressful sites, there may be only a brief period favorable for seedling growth. Seedlings that do not become well established within the 'window' are unlikely to survive. Mycorrhiza increase the capacity of tree seedlings to capture resources early by enhancing uptake of nutrients and water, lengthening root life, and protecting against pathogens." [Ibid.]

J.

FIRE AND SALVAGE IN EASTSIDE FORESTS

*****From a group of concerned scientists to the President September 19, 1994:

"Concerning the region's streams and rivers - and the fish and other species that depend on these streams - there is considerable scientific reason to believe that salvage logging and accompanying roadbuilding is one of the most damaging management practices that could be proposed for burned areas...

"Viewed at the right scale of time and space, fires are not disasters for streams, indeed fires can induce natural ecological changes that benefit streams and the species that depend on them. The natural recovery of streams after fires can result in improved fish habitat if we do not interfere with the natural recovery processes...

"Fire-killed trees are a vital part of both watershed and stream recovery, providing part of the natural environment of the reseeding and vegetative recovery of the watershed and providing vital stabilizing structure in stream channels and floodplains. If fire-killed trees are logged out of the watershed these functions, among others, are lost for decades, even centuries...

"In particular, management activities that add to the risk of increased sedimentation or that remove ecologically important large wood from the watershed present a substantial long term threat to recovery of streams. In this regard, logging and roadbuilding represent one of the most significant forces threatening to retard stream and watershed recovery...

"We know of no scientific reason to engage in salvage logging or roadbuilding in burned areas and we know of many sound reasons not to."
[G.W. Minshall, Prof. of Ecology, Idaho St. University. James R. Karr, Dir. Institute of Environmental Studies, University of WA. Judy L. Meyer, Prof. of Ecology, University of Georgia. Jack M. Bierman Prof., Flathead Lake Biological Station, University of Montana. Christopher Frissel, Research Asst. Prof., Flathead Lake Biological Station, Univerisity of Montana and Research Associate, Oregon State University.]

*****Salvage logging may reduce fuel loading but the removal of overstory trees raises the afternoon temperatures and windspeeds and decreases relative humidity. [Geiger 1975] This increases the fire danger on site. [Rothermel 1983]

*****Greater wind velocity at the plant and soil level as a result of overstory removal will decrease the boundary layer, lowering resistance to exchange. This could result in an increase in soil moisture losses during hot, windy days in the salvage logged area. [Hungerford 1980]

*****A dead, non-transpiring overstory can act as a water resevoir by storing water during rain and high humidity periods and slowly releasing it during dry periods. [Boddy 1983]

Wood on the forest floor forms long-lasting, moist micro-sites that may aid forest recovery. Decaying logs retained twenty-five times more moisture than surrounding soil following intense wildfires in SW Oregon. [M.P. Amaranthus, J.M. Trappe and R.J. Molina. Long-term Forest Productivity and the Living Soil. 1989.]

Studies as early as 1927 on the Modock N.F. note that "VERY" large snags last considerably longer than smaller snags. [F.P. Keen 1955] Fire killed pine snags in Eastern Oregon were found to remain standing roughly twice as long as trees killed by beetles. A fire killed pine of 38" DBH would stand for eighty years. [W.C. Dahms 1949]

Scientists have concluded that wildfires themselves rarely kill small mammals and birds. [Biswell 1989]

Birds of Prey are attracted to fires and benefit from an increased food source of voles and pocket gophers. Other animals that may benefit from fires include white-tailed and mule deer, elk, cougar, wolf, black bear and grizzly bear, coyote, beaver, hare, turkey, pheasant, quail and sharptailed, ruffled and blue grouse. [Lyons 1978]

Fires are seldom directly fatal to fish unless water temperatures are raised to a lethal degree. [Lyons 1978]

Excluding fire from fire-dependent types of vegetation may be detrimental to some wildlife; on the other hand, those species favored by more mature stages of vegetation may not be favored if fire is routinely used to manage the vegetation. [Biswell 1989]

"We recognize that at local scales some forms of intensive management may temporarily reduce the spread and frequency of fires. However, at landscape scales the increased homogenization of forests combined with management prescriptions that reduce fire frequencies may contribute to long-term increases in fire severity and spread of fires across homogenous landscapes, particularly through the loss of bottomland, moist forest pockets and large fire resistant trees. Moreover, intensive timber management contributes to additional fire hazards due to greater road access and associated increases in human-caused fires, operation of logging equipment, slash build-up following logging, and the associated decrease in moisture content of forest understories. In addition, managing to fire-proof forests will contribute little to the maintenance of population viability of species vulnerable to forest management practices and is inconsistent with the intent of Congress to manage the national forests to maintain viable populations (eg. National Forest Management Act 1976)." [DellaSala, Olson, Crane. in Ecosystem Management and Biodiversity Conservation: Applications to Inland Pacific Northwest Forests. Advanced Copy: Sept. 1994.]

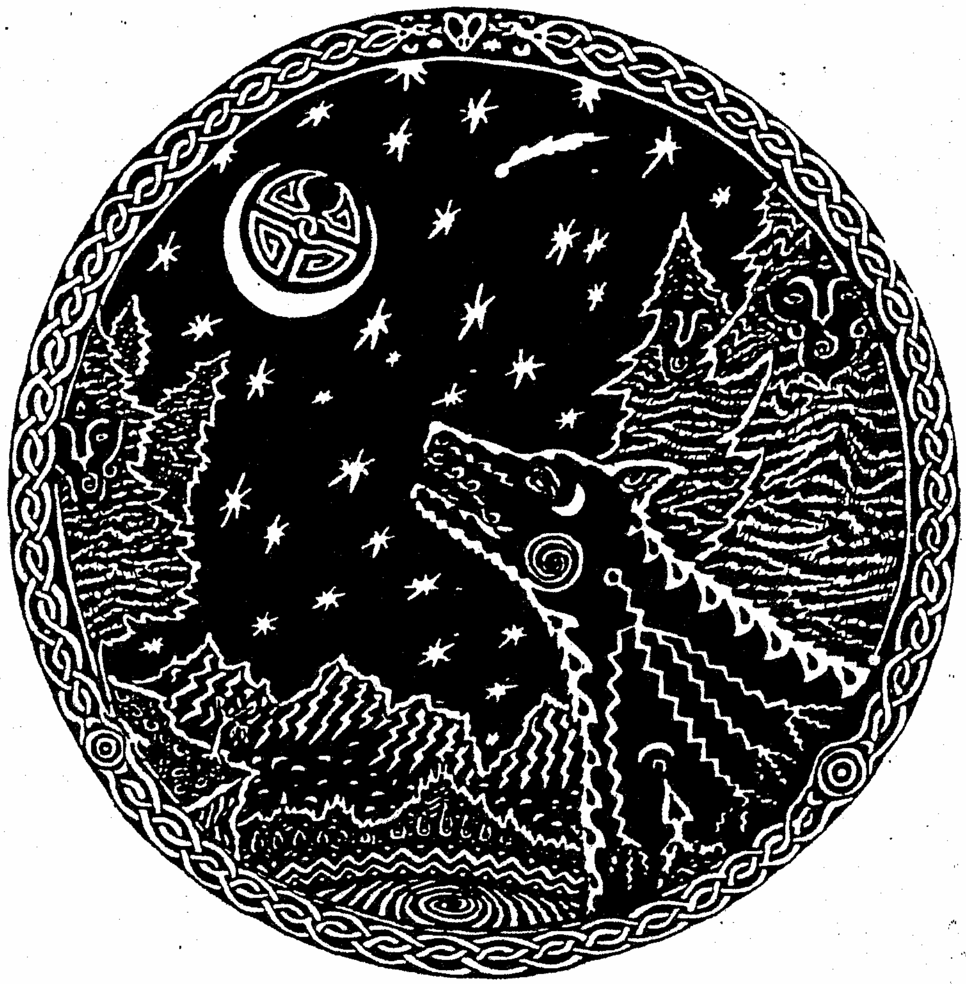
"Excluding ground fires, coupled with forestry practices such as clearcutting that convert old-growth to younger stands, has increased the probability of a ground fire moving into crowns and gaining intensity as it spreads." [David A. Perry, Testimony to Senate Field Hearing on Forest Health, Boise, August 29, 1994.]

"[A] very patchy burn is typical of typical of the moister forest types in the west; in other words, not all fires are ecosystem catastrophes, and the presses' penchant for painting disaster should be viewed with some skepticism, at least until the smoke clears." [David A. Perry 1994]

"Large blocks of public land provide the best oppertunties tc restore fire cycles through a combination of prescribed fire management and natural (ie., lighting reduced) fires that are allowed to burn without human intervention. For instance, natural fires in large, core reserves located in remote areas should be allowed to burn in order to maintain ecosystem processes and natural fuel levels." [DellaSala 1994]

"In the past, many post-fire management actions were often more damaging to ecosystem processes than the fire. The direct monetary costs associated with these post-fire management actions can be quite high, sometimes exceeding the cost of suppressing the fire." [Timothy Sexton, Masters Student, O.S.U.]

"A strong scientific basis does not exist to justify post-fire recovery efforts." [Timothy Sexton...]



Much of the current information being fed to the public on the supposed "need" for salvage logging programs is extremely misleading. Following are a series of quotations from various USFS studies, scientific and field research reports, and other sources regarding the forest ecosystem health, functions, past experience, etc. Together, these quotations essentially refute the purported "need" for a salvage logging program.

"For the most part, the situation can be ascribed (in terms of human activity) to decades of fire exclusion, selective harvesting of early and mid seral trees, livestock grazing, and little emphasis on issues which have only recently come to light; e.g., biodiversity and long term site productivity." from "Blue Mountains Forest Health Report" April '91, USFS page 1

"Aggressive fire suppression and timber-harvest practices that increase trees' susceptibility to pest and fire problems have contributed to the deterioration of forest health." ibid, pg.5

"Since soil organic matter levels and compaction appear to be the main varibles in linking management activities to long-term site productivity, it is essential that the soil and all its properties be protected." ibid, pg. 28

1 "The moth is native to, and plays an integral role in, the ecology of coniferous forests in the region. Usually persisting at

low population levels, it periodically er..[illegible] into outbreaks resulting in extensive growth loss, top kill, and mortality in infested trees. Historically, epidemics have appeared suddenly and, following a year or two of severe defoliation have subsided abruptly. Though of short duration, outbreaks have had devastating effects on infested stands. Viewed in the long-term natural cycle of forest succession, such ecological events may be beneficial." from "Wallowa-Whitman National Forest, Douglas-fir Tussock Moth, Environmental Assessment" USFS, Feb. '91, pg. I-1

"White fir, grand fir (Abies grandis (Doug. ex Don) Lindl.), and Douglas-fir defoliated by tussock moth in California, Oregon, and Washington have shown severe radial-increment loss during and immediately after defoliation (Wickman 1963, 1978b; Wickman and others 1980). The growth reduction was also related to degree of defoliation: trees defoliated 75 to 90% had more than double the growth reduction of trees defoliated less than 25%. Growth recovery was usually not complete until 4 or 5 years after defoliation. Stand conditions and tree growth were studied 10 years after a severe outbreak in California (Wickman 1978b). In that study, white fir recovery -as evidenced by increased radial growth- was well established 10 years after severe defoliation. Growth of both host and nonhost trees in the defoliated area surpassed preoutbreak rates; the reverse was true for nearby nondefoliated host trees." from "Radial Growth of Grand Fir and Douglas-fir 10 Years After Defoliation by the Douglas-fir Tussock Moth in the Blue Mountains Outbreak" B.Wickman, USFS, Aug. '86, pg. 1.

"Radial-growth recovery related to amount of tree defoliation was measured lo years after a severe outbreak of Douglas-fir tussock moth (Orgyia pseudotsugata (McDunnough). For the period 1978-82, growth of grand fir surpassed and was significantly greater than in the preoutbreak period, 1968-72. Douglas-fir growth during the postoutbreak period showed similar patterns, but it was not significantly different from preoutbreak growth for every defoliation class." ibid

"Growth recovery since the outbreak brought average radial growth to rates higher than those just before the outbreak for most grand fir defoliation classes. Growth recovery for Douglas-fir was similar but not as pronounced. The difference between 5 year preoutbreak (1968-72) and 5 year postoutbreak (1978-82) growth was significant for all grand fir defoliation classes except the 90-percent class. For Douglas-fir, postoutbreak growth significantly surpassed the preoutbreak growth for the 25-, 50-, and 75% classes." ibid

"For five decades after an outbreak of Douglas-fir tussock moth radial growth of defoliated white fir trees was significantly greater than that of nondefoliated host trees nearby. The increased growth probably was due to the thinning effect of tree mortality and increased nutrient availability." from "Mammoth Lakes Revisited - 50 Years After a Douglas-fir Tussock Moth Outbreak" B. Wickman, G. L. Starr, USFS, Dec. '90.

"One of the earliest recorded Douglas-fir tussock moth outbreaks on white fir occurred at Mammoth Lake, California, from 1936 to 1938 (Wickman and others 1973). A 5 acre plot was established there in 1938 to study the effects of defoliation. This infestation caused mortality (30% of the stand), growth loss, and top-kill (Wickman 1963). The plot was reestablished in 1970 to investigate pathological-entomological relations on top-killed trees (Wickman and Scharpf 1972). In 1977 the plot was relocated, boundries were marked, and selected trees were cored for measurement of radial growth of survivors. We found that radial growth of white fir was significantly greater than that of nondefoliated host trees nearby for 36 years after the outbreak, but in 1977 growth of all trees declined sharply as a result of a severe drought (Wickman 1980)."ibid

"The effects of thinning caused by tree mortality and the probable increased nutrient availability during and after the outbreak may have resulted in some long term positive growth effects that are still accruing 50 years later. The results to date indicate, for this stand at least, that DFTM played an important role in primary forest productivity (Mattson and Addy 1975) through increased nutrient availability in these nitrogen deficient deep pumice soils. Similar nutrient availability enhancement has been suggested by Klock and Wickman (1978) and Stoszek (1988)." ibid, pg. 4

"Outbreaks by DFTM in these situations provide a stabilizing feedback system (Odum 1969) that promotes the vigor and survival of host trees and may dampen or delay for many decades future DFTM population eruptions. Because data on nutrient cycling in forest stands before and after insect outbreaks are scarce, only continued long term studies will uncover these intriguing insect-plant relations." ibid, pg. 5

"Species dominance has changed in the postoutbreak regeneration. Ponderosa pine has increased from 2 seedlings per acre prior to the outbreak to 92 per acre currently. The tallest or fastest growing species, during the post outbreak period, are nonhost Engelmann spruce, larch, and ponderosa pine in that order." from "Natural Regeneration 10 Years After a Douglas-Fir Tussock Moth Outbreak in Northeastern Oregon" B. Wickman, K. Seidel, and G. L. Starr, USFS Nov. 1986, pg. 2.

"The status of regeneration and factors affecting establishment of seedlings on partial cuts several years after the tussock moth outbreak are reported by Seidel and Head (1983). They found that partial cuts in the mixed conifer/pinegrass community had considerably fewer seedlings than partial cuts in the grand fir/ big huckleberry community which were well stocked. Much of the understocking in the mixed conifer stands was apparently related to low and irregular overstory density, lack of advanced reproduction, reproduction destroyed by logging, and heavy grass cover." ibid, pg. 2.

"Natural regeneration was surveyed 10 years after severe grand fir mortality caused by an outbreak of the Douglas-fir tussock moth in the Blue Mountains of northeastern Oregon. The study plots were located in the Wenaha-Tucannon Wilderness. Management influences have been limited to grazing cattle and excluding fire since the early 1900's. Regeneration measurements were made in a 350-acre mixed conifer stand that suffered 40-75 percent grand fir mortality immediately after the outbreak. Plots for measuring tree damage were established in 1972; the regeneration plots were located in and adjacent to these older plots."

"Based on the percentage of 4-milacre subplots stocked, and on the average number of seedlings per acre for all species and ages, regeneration was moderate. There were 572 seedlings per acre and 496 were in the post outbreak class. Sixty percent of the 4-milacre subplots were stocked with at least one seedling of any age and 54 percent were stocked with seedlings of post-outbreak age. Regeneration establishment since the outbreak has been spotty. Depending on the definition of adequate stocking, the proportion of plots successfully regenerated can be determined. If 60 percent of 4-milacre subplots is considered satisfactory, then only half the plots met this criteria and the area as a whole is understocked. On the basis of seedling density, however, 67 percent of the subplots had at least 400 trees per acre and understocking is not a problem." ibid, pg. 1.

"Grand fir, ponderosa pine, Douglas-fir, and Engelmann spruce were the most common species in that order. Stocking of ponderosa pine in the postoutbreak regeneration was 19.7 percent compared to a preoutbreak level of 0.7 percent. Douglas-fir stocking has also increased in the postoutbreak regeneration." ibid, pg. 1.

"Twelve years later the stand is again dominated by scattered, mature ponderosa pine, and pine regeneration is becoming an important component of the stand. But grand fir is the most prevalent species and unless a light wildfire burns in this part of the wilderness area, fir will slowly dominate and canopy closure will occur. In 70, 80, or 90 years the conditions of the site, trees, and insects will have come full circle and await the propitious combination of factors that will trigger the next DFTM outbreak and facilitate the demise of a grand fir-dominated stand in the Blue Mountains." ibid, pg. 13.

"Outbreaks of forest insects are part of the natural cycle of renewel that maintains resilience and diversity. If we eliminate such outbreaks without substituting a similar mechanism, we may jepardize the process that gave us the resource to manage. For example, a rigorous fire-exclusion policy has seriously reduced some wildlife habitat diversity, intensified some pest problems, and increased the risk of more destructive fires (USDA Forest Service 1981). from "Western Spruce Budworm and Forest Management Planning" USDA/USFS Technical Bulletin No. 1696, pg. 10.

"...the forest ecosystem is a complex of plants and animals that interact with one another and their immediate environment. Recognizing and understanding these interactions is of great importance to forest management. Unilateral actions against a single pest organism may create conditions favorable to another pest." ibid, pg. 10.

"Ecosystems exhibit variable but not always readily definable properties of stability and resilience. They are generally regarded as relatively stable (that is, persistent) and resilient (capable of returning to their original state in spite of what is done to them). This is not entirely true -as many world deserts (formerly forests) and swamps (formerly productive lakes) testify. The extent an ecosystem (or component of it) can be changed -and return to its original state- is limited." ibid, pg. 10.

"Two factors--effective fire control and economic selection cutting- have done much to create the conditions that were conducive to dramatic increases in budworm populations in the early 1950's. The nearly complete elimination of light surface fires, which had periodically removed most of the shade tolerant understory trees, resulted in forests succeeding toward a much larger proportion of budworm hosts -the shade-tolerant species. Economic-selection cuttings in the first half of this century generally removed the valuable seral species, such as ponderosa pine, western larch, and western white pine, and left the less sought after true firs and Douglas-fir -all budworm hosts." ibid, pg. 4.

"The amount of tree mortality caused by budworm is rarely extensive and usually occurs in suppressed understory trees. The nature of budworm-caused mortality usually makes salvage treatments impractical; indiscriminate salvage can also result in future problems with other pests." ibid, pg. 30.

"Hindsight is often 20/20, but it is hard not to give the beetles credit for defeating the puny efforts of the entomologists to stop the infestation. The outbreak covered a large area in and around the park, and most of the lodgepole pine stands in this area were at a susceptible age for attack. The control efforts may have delayed the killing of large trees in high-use recreation areas, but one by one or two by two, most of them also fell victim either during the 8 years of battle or in ensuing years. The main lesson learned was that once a mountain pine beetle population erupts over a large area of susceptible forest type, and as long as environmental conditions remain favorable, there really is no way to stop it until almost all the susceptible trees are either killed or removed by logging*" from "The Battle Against Bark Beetles in Crater Lake National Park: 1925-34" pg. 38. *(-and if "almost all the susceptible trees" were "removed by logging" what would remain of the forests but vast clearcuts with no decomposing trees to replenish the nutrient-depleted soils?).

"Superimposed on the ecosystem base of soil, water, and air is an interconnected network of resources such as vegetation, wildlife, fish, and recreational opportunity. These resources are what users of the National Forests demand, and they are what National Forest management has historically provided, even though the emphasis of our resource management practices has been product oriented. For example, if an insect infestation occurs and results in dying or poorly growing trees, our approach has been to conduct salvage operations that recover wood products and suppress insect populations to an extent that prevents further losses. On relatively few occassions has a more holistic approach to management been taken. Because our management philosophy has been product- rather than ecosystem-oriented, there has been little attempt to explore the root causes of insect infestations and examine the long-term impacts of the treatments we prescribe." from "Blue Mountains Forest Health Report, "New Perspectives in Forest Health"" USFS April '91, pg.15.

-the following information is from "Forest Insect & Disease Leaflet 53" USDA/USFS, pg. 7 & 6.

"Budworm populations are usually regulated by combinations of several natural factors such as insect parasites, vertebrate, and invertebrate predators, and adverse weather conditions. However, the combined effect of natural agents does not prevent or reduce population resurgences when climatic and forest stand conditions are favorable for an increase in budworm populations. During prolonged outbreaks when stands become heavily defoliated, starvation can be an important mortality factor in regulating populations.

5 Western spruce budworm larvae, pupae, and adults are parasitized and preyed upon by several groups of insects and other arthropods, small mammals, and birds. There are more than 40 species

of insect parasites (small wasps and flies) of the western spruce budworm, of which four or five species are most common. Spiders, ants, snakeflies, true bugs, and larvae of certain beetles feed on the budworm, as do chipmunks and squirrels. Birds known to feed on the budworm include grosbeaks, warblers, thrushes, sparrows, flycatchers, tanagers, siskins, and waxwings."

"Newly established seedlings are particularly vulnerable to being seriously damaged or killed by larvae, particularly when partial cutting methods leave host tree species in the residual overstory stand. At times, however, very small seedlings are not seriously damaged or killed, probably because many larvae dispersing to the forest floor are eaten by insect and small mammal predators."

the following information is from "Forest Insect & Disease Leaflet 86" "Douglas-fir Tussock Moth" USDA/FS, pg. 6,7, &8.

"Many natural controls exist that keep the number of tussock moths low most of the time. In populations that persist at low densities, over 90% of the larvae and at least 75% of the pupae and eggs are killed each generation by natural causes. If such mortality does not take place, the population will increase rapidly.

Overwintering eggs are usually heavily parasitized by small wasps. Birds, such as the mountain chickadee and red breasted nuthatch, also feed on tussock moth eggs and may destroy a large portion of the overwintering masses.

After the surviving eggs hatch, some young larvae are lost while dispersing from the egg mass to feeding sites on new foliage. Others are eaten by birds, spiders, and predaceous insects. Insect parasites attack all ages of larvae, but a parasitic fly, Carcelia yalensis Sellers, is an especially effective enemy. It lays its eggs on the backs of mature tussock moth larvae. The maggot enters the caterpillar's body and eventually kills the host in the pupal stage. Pupae are also killed by a variety of wasplike parasites that attack the cocoon directly. Birds also prey on cocoons and can destroy a significant proportion of the pupal population at low tussock moth densities.

At outbreak numbers, tussock moth populations have escaped their usual natural controls and have been affected by additional mortality factors related to their high numbers. A nuclear polyhedrosis virus capable of wiping out large numbers of larvae and pupae usually appears only in relatively dense populations. Its presence, in combination with other mortality factors, frequently causes collaspe of outbreak populations. When diseased larvae die, their internal organs liquefy. The virus spreads through the population when these bodies fall to the ground and rupture or lie smeared over the foliage. Virus particles may persist in the environment for many years thereafter.

In the absence of viral disease, outbreak populations of tussock moth are ultimately limited by the quantity and quality of available food. Early defoliation of the current year's needles eliminates the preferred food and forces larvae to feed on less nutritious older needles. This causes starvation and lowered production and survival of eggs, and helps reduce population numbers to a level where they are again regulated by the usual natural enemies."

"Salvage harvesting of proposed stands will not prevent the spread of bark beetles into healthy trees.", "Logging makes trees more susceptible to bark beetle attack." -Dr. William Bedard Ph. D., a forest pathologist and international bark beetle expert.

"...attacks on pondero pine signal the end of outbreak in an area, usually within 2 years..." -Russell Mitche..., a Forest Service entomologist.

"Even dead, those trees play an important role as homes for cavity nesting birds. If they topple into streams, they can create deep pools that provide resting areas for fish." -Dave Scott, a Forest Service entomologist.

"...forest penetration by roads increases site access and tree susceptibility to a number of potential pests." from "Pests Link Site Productivity to the Landscape" -T. D. Schowalter and J. E. Means in "Maintaining Long-Term Diversity of Pacific Northwest Forest Ecosystems".

"We need to conserve as many of the remaining old-growth ponderosa pine and mixed conifer stands as possible, We need them for their gene pool seed source, biological diversity, and as living examples of our long-term objectives... Fighting fires and spraying bugs does have temporary positive inputs for local economies, but future generations are not going to be happy with the Blue Mountain forests we leave to them." B. Wickman, Chief Research Entomologist, in "Forest Health in the Blue Mountains: Insects and Diseases".

"...build up their stockpiles of logs in anticipation of a rebound in the market, and see the salvage program as a way to do that at reduced cost." -T. Cullinan, National Audubon Society biologist on a possible motivation behind the salvage program.

"The west side timber sales are all tied up in appeals, the eastside is the only game going" -Congressman Bob Smith, a well known timber industry proponent, on one of the "needs" for salvage logging in Eastern Oregon.

LOWD. 10 Summit Malheur NF

IV. THE FOREST ERVICE HAS FAILED TO ADEQUATELY ANALYZE WILDLIFE ISSUES AND ENSURE VIABLE POPULATIONS OF WILDLIFE SPECIES.

NFMA imposes substantive duties upon the Forest Service, including the duty to "provide for diversity of plant and animal communities." 16 U.S.C. §1604(g)(3)(B); Inland Empire Public Lands v. USFS, 88 F.3d 754, 759 (9th Cir. 1996). The regulations state:

> Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

36 C.F.R. §219.19; See also 36 C.F.R. §219.26, 36 C.F.R. §219.27(a)(6). This substantive and mandatory provision applies to site-specific timber sales, as well as Land Resource Management Plans. Inland Empire, 88 F.3d at 760-61, n.6. For a number of species, the Forest Service has failed to fulfill its duty to ensure viable populations within the Summit project area.

A. PRIMARY CAVITY EXCAVATORS.

The Summit Fire Recovery Project will not provide for the diversity of, nor be carried out in a manner consistent with the protection of, primary cavity excavators. Snags and eventually their green tree replacements are used by primary cavity excavators for nesting, feeding, and perching. In order to account for the loss of green tree replacements due to the fire, the proposed snag levels are above Forest Plan levels. FEIS at F-291. However, these levels are still too low to ensure the protection of primary cavity excavators. The Forest Service proposes to leave 439 snags/acre for the Hot-Dry/Warm-Dry environments, 11 snags/acre for the Cool-Moist environment, and 8+ snags/acre for the Cool-Dry environment. Summit Fire ROD at R-11. The Forest Service admits in the FEIS that:

> Based on recommendations by Evans and Marten (1995) for numbers of snags based on fire intensity and biophysical environment; [this] range would likely not meet the short-and long-term nesting and foraging needs of white-headed, Lewis', and hairy woodpeckers, northern flickers, and Williamson's sapsuckers. . . There probably will be a decline in the numbers and diversity of those species inclined to use hot-dry/warm-dry biophysical environments.

FEIS at 4-77 (emphasis added); see also FEIS 4-171. Based on the Forest Service's own conclusions, the proposed snag levels are inadequate to ensure the Summit Fire Recovery Project is consistent with the protection of the white-headed, Lewis', and hairy woodpeckers, norther flickers, and Williamson's sapsuckers. Therefore, NFMA wildlife mandates are violated.

Further, the black-b[illegible]d and three-toed woodpeckers may [illegible] be protected by the Summit Fire Recovery Project. The alleged impacts to these woodpeckers are briefly addressed in a short paragraph: "[t]hree-toed and black-backed woodpeckers would probably be minimally affected by salvage, since many areas are being left intact, providing more snags than any other alternative." FEIS at 4-76. However, these fire dependent species require canopy closure of at least forty percent (40%), and home ranges of at least 956 acres per black-backed pair and 528 acres per three-toed pair. See Exhibits M and N.[10] Although this information is necessary in order for the Forest Service to make an informed decision regarding whether to drastically reduce the forest canopy, it was not disclosed nor is there any indication that it was ever considered. NEPA requires that the Forest Service take a "hard look" at the environmental consequences of a project before taking a major action. Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc ("NRDC")., 462 U.S. 87, 97 (1983). The purpose of NEPA is "to insure a fully informed and well-considered decision." Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 558 (1978). The Forest Service must adequately identify and evaluate all adverse environmental effects of a proposed action, and "articulate a rational connection between the facts found and the choices made." Baltimore Gas, 462 U.S. at 105. The Forest Service has violated NEPA by not articulating a rational connection between its conclusion that these woodpeckers will be minimally affected and the facts we have brought forth on these species. Until it does so, NFMA is also violated since the Forest Service can not insure that the Summit Fire Recovery Project is carried out in a manner consistent with the protection of the black-backed and three-toed woodpeckers.

The pileated woodpecker also may not be protected by the Summit Fire Recovery Project. The alleged impacts to this species are briefly addressed in a short paragraph; "[p]ileated woodpeckers would probably not be affected by the removal of large diameter trees as studies show they are a rare visitor to early post-fire communities." FEIS at 4-76. The Forest Service assumes that because pileated woodpeckers may require live canopy cover in mature/old growth forests for nesting, they do not exist in the Summit Fire area. FEIS at 3-31. However, the Forest Service does not disclose or otherwise indicate whether pileated woodpeckers are using the Summit Fire area for foraging. The Appellants, in fact, know that pileated woodpeckers do use the Summit Fire area for foraging. Pileated woodpecker sightings have been made in Unit 300, and signs of their foraging were found in Units 1, 307, and 309. See Exhibit O. Based on this on the ground evidence, the non-existence of the pileated woodpecker may not be summarily made. Further, it is quite possible that due to cumulative impacts to the woodpecker's customary habitat by future salvage sales due to the Summit, Bull, and Tower Fires, and past, ongoing, and reasonably foreseeable future public and private lands logging in and around the Summit Fire area

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[10] The Forest Service does admit that these woodpeckers either appear only after a fire or dominated early post-fire bird communities. FEIS at 3-36 & 4-71-4-72.

such as the proposed Dixie Butte sale, the burned mature/old growth forests within the Summit Fire area are necessary for the viability of the pileated woodpecker. [illegible] area surveys are conducted by the Forest Service for pileated woodpeckers. NFMA is violated since the Forest Service can not insure that the Summit Fire Recovery Project is carried out in a manner consistent with the protection of this woodpecker. NEPA is also violated since it is apparent that the Forest Service is not taking a "hard look" at the environmental consequences on pileated woodpeckers of the Summit Fire Recovery Project. See Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc ("NRDC")., 462 U.S. 87, 97 (1983).[11]

B. NORTHERN GOSHAWK.

The Summit Fire Recovery Project FEIS fails to analyze the impacts on the foraging home range of the Northern goshawk. The Forest Service admits that pre-fire, it is likely that goshawks nested and foraged within the project area. FEIS at 3-37. However, the FEIS environmental consequences section states only that there are "[n]o salvage impacts to the northern goshawk . . . as the project area does not contain habitat suitable for nesting or post-fledging activities." FEIS at 4-70 (emphasis added). The FEIS is silent as to the impact on the goshawk of regenerating 9,560 acres of its foraging home range.

The failure to discuss or analyze the potentially significant impacts on the northern goshawk's foraging home range violates both NFMA and NEPA. NFMA is violated since the Forest Service can not insure that the Summit Fire Recovery Project is carried out in a manner consistent with the protection of the goshawk. NEPA is also violated since it is apparent that the Forest Service is not taking a "hard look" at the environmental consequences on the northern goshawk of the Summit Fire Recovery Project. See Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc ("NRDC")., 462 U.S. 87, 97 (1983). Generally, the home foraging range of the northern goshawk is 5,000 to 17,000 acres and consists of high canopy closure. See Exhibit Q. For the Summit Fire area, the actual range may be even larger due to the fragmented, burned habitat and reduced prey population densities. Id. As with the pileated woodpecker, the viability of the northern goshawk may be contingent upon the burned mature/old growth stands within the Summit Fire area, due to cumulative detrimental impacts to the goshawk's customary foraging home range by future salvage sales due to the Summit, Bull, and Tower Fires, and past, ongoing, and reasonably foreseeable future public and private lands logging in and around the Summit Fire area.

[11] Finally, the FEIS fails to disclose management proposals for any primary cavity excavators based upon scientific research of their habitat needs. Proposals should include management for three (or more at above minimum levels) pairs per "habitat block" with blocks distributed across the landscape. See Exhibits M-P (specific habitat needs of primary cavity excavators).

C. AMERICAN MARTEN.

The American marten is a Management Indicator Species ("MIS") for old growth forests. FEIS at 3-34. The marten was selected by the Malheur National Forest to estimate the effects of the proposed project on old-growth dependent species, as its "population changes are believed to indicate the impacts of management activities." 36 C.F.R. 219.19(a)(1). As stated in the FEIS, MIS are used to assess the maintenance of population viability (the ability of a population to sustain itself naturally) and biological diversity. FEIS at 3-34.

The Summit Fire Recovery Project will not provide for the diversity of, nor be carried out in a manner consistent with the protection of, the American marten. The Forest Service mentions two intact dedicated old growth areas within the Summit Fire project area meet marten habitat requirements. FEIS at 3-34. However, the Forest Service acknowledges that it does not know whether these areas are in fact occupied by marten, thereby evidencing a failure to survey the project area for the marten, in violation of NFMA. See FEIS at 3-34; 36 C.F.R. 219.19(a)(6) (population trends of the management indicator species shall be monitored). Further, the Forest Service fails to mention the size of the two intact dedicated old growth areas, whether connectivity corridors exist between these and other old growth areas, and whether any assessment was done on how much additional home range area is needed by a marten inhabiting an intact old growth area. All of these issues must be addressed before assurance may be made that the Summit Fire Recovery Project is carried out in a manner consistent with the protection of the American marten, a designated management indicator species. See Exhibit R.[12]

D. WOLVERINE.

The Summit Fire Recovery Project FEIS cumulative impacts analysis for the California wolverine, a sensitive species, was inadequate and in violation of NEPA. FEIS at 3-33. The Forest Service is required by NEPA to discuss direct, indirect and cumulative impacts and their significance. 40 C.F.R. §1502.16(a)&(b) & §1508.8. Cumulative impacts are those that result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency . . . or person undertakes such other actions." 40 C.F.R. §1508.7. The Forest Service must consider non-Federal and other National Forest cumulative impacts before implementing specific sales. Resources LTD., Inc. v. Robertson, 35 F.3d 1300, 1306 (9th Cir. 1993). Despite NEPA's mandate, the Forest Service made no attempt to identify actions occurring on lands outside of the Long Creek Ranger District's acreage burned

[12] NEPA is also violated due to the failure to insure a fully informed and well-considered decision. See Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 558 (1978) (the purpose of NEPA is "to insure a fully informed and well-considered decision"). The Forest Service has not adequately identified and evaluated the adverse environmental effects of this proposed action on the marten. See Baltimore Gas, 462 U.S. at 105.

young wolverines, weighing much less than bear cubs, would become ill, or like the marten, die. See FEIS at 4-79. Since the wolverine is a sensitive species, and is identified as such based on the Forest Service's concern for the viability of the species due to current or expected downward trends in population numbers, it is imperative that an adequate impacts analysis occur. If young wolverines may die after ingesting one or two poisoned pocket gophers, these impacts must be disclosed. Inland Empire Public Lands v. U.S. Forest Service, 88 F.3d 754, 758 (9th Cir. 1996) (one goal of NEPA is to guarantee that information on potentially significant impacts of a project will be available to the public). The NFMA is also violated until the impacts on young wolverines are disclosed and the Forest Service determines whether regenerating 9,560 acres of forest land - which causes the need to poison gophers - is consistent with the protection of the wolverine. 16 U.S.C. § 1604(g)(3)(F)(v).

The Forest Service decision to use strychnine bait in or near areas designated as marten habitat is also arbitrary and capricious. Marten and other small mammals may die from eating only one poisoned pocket gopher. FEIS at 4-79. The Forest Service's own references recommend using non-toxic alternatives in forest areas inhabited by special interest species such as the marten. Id. The marten does in fact inhabit the Summit Fire area and therefore nontoxic alternatives should be used. Id.[21]

The Summit Fire Recovery Project FEIS does not adequately address the impacts of pocket gopher poisoning on young raptors in violation of NEPA and NFMA. Detrimental impacts to nesting raptors that are fed poisoned pocket gophers by adult raptors are unknown, but could conceivably be severe due to their lower body mass. FEIS at 4-79. Young raptors, like small mammals, may die due to ingestion of one poisoned gopher. Death of young raptors may have significant impacts upon raptor populations which must be disclosed to the public. Inland Empire Public Lands v. U.S. Forest Service, 88 F.3d 754, 758 (9th Cir. 1996) (one goal of NEPA is to guarantee that information on potentially significant impacts of a project will be available to the public). The NFMA is also violated until impacts on young raptors are disclosed and the Forest Service determines whether regenerating 9,560 acres of forest land - which causes the presumed or purported "need" to poison gophers - is consistent with the protection of the young raptors. 16 U.S.C. § 1604(g)(3)(F)(v).

The Summit Fire Recovery Project FEIS fails to adequately discuss the impact that poisoning gophers will have on reduced prey base. The prey base will already be reduced due to the fire and proposed logging. For the Forest Service to summarily dismiss the impact that reducing the gopher populations by 70-90 percent as insignificant, is arbitrary and capricious. Despite no documentation, the Forest Service came to this conclusion by determining that the

[21] The male marten home range for one marten can be up to 5,000 acres. See Exhibit R.

9,650 acres to be baited represe... only a small portion of the total home ... age of all predators.

Finally, the FEIS fails to disclose the beneficial and essential role pocket gophers play in restoring and maintaining soils. Gophers loosen soil, provide and distribute necessary nutrients and seeds, and help aerate and irrigate soils. See Exhibit S. The gophers' survival rather than extermination is essential to meeting the Summit Fire Recovery Project's purpose and need to accelerate ecosystem restoration. See FEIS at 1-10.

X. THE FOREST SERVICE HAS IMPROPERLY DETERMINED THE SIZE OF DEDICATED OLD GROWTH.

The formula used by the Malheur National Forest to determined the size of dedicated old growth areas violates NFMA and NEPA. The Forest Service proposes to maintain 160 acres of mature and old growth stands every 4000 to 5000 acres for the marten, and 300 acres of mature and old growth stands every 12,000 acres for the pileated woodpecker. FEIS at 4-64. This proposal is unlikely to sustain viable populations of the marten or pileated woodpecker. See Exhibits R and O. Therefore, NFMA is violated since regeneration cuts are allowed only when consistent with the protection of the marten and the pileated woodpecker. 16 U.S.C. §§ 16 U.S.C. §1604(g)(3)(F)(v). Further, NEPA is violated because the science used to determine the size of and distances between the dedicated old growth is completely outdated. Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc ("NRDC")., 462 U.S. 87, 97 (1983) (NEPA requires that the Forest Service take a "hard look" at the environmental consequences of a project before taking a major action); Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 558 (1978) (the purpose of NEPA is "to insure a fully informed and well-considered decision"); Exhibits R and O.

XI. THE FOREST SERVICE HAS NOT ADEQUATELY ADDRESSED HERBICIDE ISSUES.

The FEIS fails to comply with NEPA as it is impossible for the public to determine what impacts the use of herbicides will have on wildlife and the surrounding environment. First, the amount of acreage on which herbicides will be applied varies throughout the documentation from 3.19 acres to 636 acres, and then all the way up to 3,400 acres. Most importantly, the ROD discusses the allowance for "the use of chemicals, if necessary, for control of up to 3,400 acres for competing and unwanted vegetation," without disclosing where this 3,400 originates or was analyzed. Rod at R-8. Clearly the potential impacts on the environment will increase as the number of acres "treated" with chemicals also increases. Second, the FEIS fails to address compliance with the Mediated Agreement on herbicide use, which requires the Forest Service to emphasize the prevention of herbicide use as the first priority, and to establish the use of herbicides as the last resort. It appears from the FEIS that the Forest Service failed to emphasize prevention in the past, and has failed to d…onstrate the need for chemicals in this …se.

Third, the FEIS fails to disclose or analyze the relative effectiveness and less detrimental impacts of the various non-chemical control methods, and fails to support its conclusion that herbicides is necessary method for this project. In general, the FEIS continuously makes unsupported assumptions without citing any scientific authority or evidence to back its case for using herbicides.

Fourth, the FEIS fails to adequately consider the potential impacts of herbicide use on wildlife and fish species, water quality, and biodiversity. For example, for water quality, the potential concentrations of the herbicides in the water are disclosed without discussing the implication of these concentrations. And, the FEIS fails to disclose potential impacts on the individual threatened, endangered, sensitive, or management indicator species which may be present in the sale area. Fifth, the FEIS fails to adequately and accurately disclose the potential health effects for backpack sprayers, firefighters, and the general public.[22] The Forest Service needs to disclose the indirect effects of chemical spraying that will put firefighters at an increased risk of toxic exposure in the event of wildfire. Sixth, the FEIS fails to disclose that herbicide spraying increases the fire hazard for the "treated" stands. (Bentley, et al., 1971; Stewart, 1978).

Seventh, the FEIS does not disclose the past effectiveness of Forest Service employees following FIFRA guidelines. Without site-specific data given for the locations where herbicides will be used and when they will be used, the public cannot determine what the impacts may be on various wildlife species; how drift to riparian areas will be avoided; what the impacts will be on native trees and plants, how seeps, springs, streams, permeable soils, and other areas with high soil moisture will be avoided; and how handlers will be protected from drift or direct contact. Finally, the FEIS failed to address and analyze the difference between active ingredient toxicity and product formula toxicity.

XII. THE FOREST SERVICE FAILED TO DISCLOSE THE RELATIONSHIP OF THE PROPOSED PROJECT TO THE FEDERAL WILDLAND FIRE MANAGEMENT POLICIES.

In violation of NEPA, the FEIS fails to explain the relationship of this Project to the new Federal Wildland Fire Management Policies. The FEIS further fails to disclose the Fire Management Action Plans for the subwatersheds and special management areas within the Project area, and then disclose whether these plans have been revised in order to comply with the new federal policies.

[22] Not all Appellants lived in this area when the FEIS on Vegetative Management was released, and do not consider the health risks to be "acceptable" as claimed in the Summit FEIS. FEIS at 4-146.

CONCLUSION

The layers of fog surrounding past Forest Service decisionmaking are beginning to dissipate, leaving the agency with volumes of unproven, uncertain, and unsubstantiated NEPA documentation. What remains is the commodity-driven, irrational decision to take 108 million board feet of timber from an already deeply scarred landscape, further injuring imperiled Steelhead, bull trout, salmon, and old-growth dependent species. The Forest Service must release for renewed public comment a substantially revised or supplemented Draft EIS for its proposed Summit Fire Recovery Project. The revised or supplemented Draft EIS must properly disclose past failures, uncertainties, and the weight of scientific opinion against its proposal; and must include an impartial discussion and analysis of all reasonable alternatives, including a scientifically and biologically based restoration alternative, and a "passive" management alternative. The Forest Service must then demonstrate full compliance with all substantive provisions of the National Forest Management Act, including the Malheur Forest Plan as amended, the Endangered Species Act, and the Clean Water Act, including Oregon's state water quality standards and Antidegradation Policy.

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Respectfully submitted,

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WILDFIRE AND SALVAGE LOGGING

Recommendations for Ecologically Sound
Post-Fire Salvage Management and Other Post-Fire Treatments
On Federal Lands in the West

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PREFACE

This paper offers a scientific framework of principles and practices that are provided to guide development of federal policy concerning wildfire and salvage logging and other post-fire treatments. A common thread throughout the recommendations is that most native species are adapted to natural patterns and processes of disturbance and recovery in the landscape and that preventing additional human disturbance (and reducing the effects of past disturbance) generally will provide the best pathway to regional ecological recovery. We assume that maintenance of viable populations of native species across their native ranges and the protection of critical ecosystem functions and services are desired objectives of federal land management, as stated in relevant legislation.

Land management practices in the interior Columbia and upper Missouri basins have profoundly impacted forest, grassland, and aquatic ecosystems. Watersheds and forests have been degraded (e.g. ecosystems fragmented, habitats simplified or lost, disturbance regimes altered). At every level of biological organization – within populations, within assemblages, within species, and across the landscape—the integrity of biological systems has been severely degraded. This degradation is best seen in the marked reduction in the biological diversity in the region.

The entire range of land management practices is implicated in this regionwide decline. Streamside development, logging, grazing, mining, fire suppression, removal of beaver and large predators, water withdrawals, introduction of exotic species, and chronic effects of roadbuilding have cumulatively altered landscapes to the point where local extirpation of sensitive species is widespread and likely to continue. Areas dominated by healthy populations of native species of vertebrates are exceptional. Many of these changes began long before the establishment of wilderness areas and other protections, and therefore, the majority of the region has been impacted.

Western ecosystems have evolved with, and in response to, fire. While some have argued that fire is the major imminent "threat" to the health of the region's forest ecosystems, it must be recognized that there are a number of threats to the integrity of ecosystems in the interior west. In view of the multifaceted human disturbances that pervade the region, it is highly inappropriate to focus on fire to the exclusion of other significant threats to aquatic and terrestrial ecosystem integrity, such as inappropriate levels and methods of logging, grazing, mining, and roadbuilding.

Land management based on controlling fire will not set the region on a course toward recovery, especially when conceived in a crisis mode. Rather, it will be necessary to take an approach based on fundamental principles of ecosystem patterns and processes, something the current crisis mode is not conducive to. The objective of this document is to propose guidelines concerning wildfires, salvage logging, and other post-fire treatments, particularly from an aquatics perspective, that maintain or improve the integrity of ecosystems and landscapes and maintaining the ecological processes that support sustainable resource extraction and utilization.

If historical land uses have contributed to the decline in forest ecosystem health, then the pattern of human land use must be changed for regional ecological recovery to occur. By narrowly concentrating on forest health (often a euphemism for tree health, recently referring to carbon cycling), federal land managers have embarked on an ambitious attempt to address forest management in ways that risk neglecting watershed health and the ecology of aquatic ecosystems. The problem is not that we do not have the knowledge to control all disturbances. The problem is we have tried to control all disturbances rather than letting them play out–the forests depend on disturbances to maintain their integrity just like rivers depend on floods and droughts coming along in irregular patterns. Human disturbances, unlike Mount St. Helens or El Niño, tend to be incessant, and thereby may produce conditions outside the evolutionary experience of native species. In view of the extent and persistence of human disturbance throughout forest and watershed ecosystems, continuing to simply manage fire risk without controlling the adverse effects of logging, grazing, roadbuilding, and mining is unsound resource management; it is an approach that without careful thought could lead to further damage rather than to the intended goal of protecting forest and stream health, as such an approach addresses the symptoms rather than the causes. Because we are currently unable to understand and control all human perturbations, we must instead seek to manage the human impacts on these systems. However, given our imperfect knowledge of ecosystem processes, functions, and disturbance regimes, we face high risks of exacerbating the degradation that already exists, especially in aquatic ecosystems. Rather than focusing on fires -- before or after their occurrence-- managers should focus on the pattern and consequences of current and proposed human manipulations and disturbances of all types at the landscape level.

The current policy framework

The National Forest Management Act (NFMA) and the National Environmental Policy Act (NEPA) allow greater liberties to be taken following fire than in other aspects of land management. On National Forests, post-fire salvage activities are treated differently than other logging in the course of environmental review. Salvage may be conducted on lands not otherwise eligible for logging; may exceed allowable sale quantities and maximum logging area rules; may be exempt from anti-clearcutting rules; and may be exempt from most forest plan standards and NFMA standards, e.g., soil protection and water quality standards. Furthermore, some salvage activities are exempt from NEPA review and administrative appeal.

New policies are forming. Two ongoing federal land planning processes which address fire and salvage policies on federal lands in the region are in progress -- The "Interior Columbia Basin Ecosystem Management Project" and "The Western Forest Health Initiative." Most recently, there have been Congressional salvage initiatives and amendments. In addition there are a host of site-specific initiatives and projects being implemented on accelerated timetables in reaction to 1994 fires. Our recommendations apply to both regional and site-specific initiatives.

FINDINGS AND RECOMMENDATIONS FOR FIRE MANAGEMENT AND SALVAGE LOGGING

Ongoing human activity and the residual effect of past activity continue to threaten watershed ecosystem integrity.

Throughout the west, many scientific assessments of current conditions have come to remarkably similar conclusions: a century and a half of logging, grazing, roadbuilding, mining, water withdrawals, channelization, introduction of exotics, and streamside development have degraded watersheds, modified stream flows and temperatures, altered ecosystem processes, and removed ecosystem elements with the result that sensitive native species have frequently been extirpated or limited to refuges. The ability of ecosystems to recover has been substantially compromised. These conclusions have been reached by a wide variety of observers and over a wide range of scales. (Nehlsen et al., 1991; Johnson et al., 1991; Frissell 1993; FEMAT 1994; Henjum et al., 1994; McIntosh et al., 1994)

Forests of the interior west can be viewed as a sea of relatively recently altered ecosystems surrounding a few "islands" of relative ecosystem integrity (Frissell 1993a). In this context, attempting to continue to manage fire and its consequences without altering or controlling other threats to ecosystem integrity, including logging, grazing, roadbuilding, and mining, is scientifically and pragmatically unsound.

Fires are an inherent part of the disturbance and recovery patterns to which native species have adapted.

Western ecosystems evolved with and in response to fires. Fires are a part of the pattern of disturbance and recovery that provides a physical template for biological organization at all levels. Fires reset temporal patterns and processes that, if allowed to proceed undisturbed by additional human impacts, provide dynamic and biologically critical contributions to ecosystems over long time frames. The "patchiness" of fire is a desirable characteristic, and many species depend on the environmental influences that fires create.

While fire suppression and other practices has doubtlessly increased the likelihood of high intensity fire in some places, it is important to recognize that this increased risk does not exist equally across the landscape. Certain forest types (low elevation ponderosa pine, for example) may currently be susceptible to burning in ways that have not been seen for centuries, but in other areas (the higher elevation and moister, mixed-conifer forest types for example) the fire situation is probably not too different from historical patterns.

The historical and paleoecological record reveal periods of time when fire occurrence was frequent, others when scarce. We need to acknowledge that some forests are simply going to burn. We also need to accept that in many drier forest types throughout the region, forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years.

There is no ecological need for immediate intervention on the post-fire landscape.

With respect to the need for management treatments after fires, there is generally no need for urgency, nor is there a universal, ecologically-based need to act at all. By acting quickly, we run the risk of creating new problems before we solve the old ones. Ecologically speaking, fires do not require a rapid human response. We should not talk about a "fire crisis" but rather of managing the landscape with the anticipation that fire will eventually occur. Given the high degree of variability and high uncertainty about the impacts of post-fire responses, a conservative approach is warranted, particularly on sites susceptible to on-site erosion.

Existing condition should not be used as "baseline" or "desired" conditions upon which to base management objectives.

In landscapes disturbed by human activities, it is ecologically inappropriate to use current conditions as the baseline for analysis. To do so effectively ignores the chronic or continuing effects of past management activities. Analysis of sediment impacts, for example, that accept existing conditions as the baseline are highly inappropriate because these have been increased over natural background levels for 50-100 years in many cases. There is considerable evidence that current conditions are insufficient to maintain viable populations of many native speci..., including sensitive and declining trout, salmon, and other fishes (FEMAT 1993; PACFISH 1995; Frissell 1993b, Reeves and Sedell 1992; and others).

Fire suppression throughout forest ecosystems should not automatically be a management goal of the highest priority. The overall management goal must be to preserve (and reestablish) the fire and other disturbance regimes that maintain ecological systems and processes, while protecting human life and property.

Making fire prevention a high priority management goal is a commitment to continuous fire suppression and a prescription for long-term "addiction." Such an attempt requires continual high cost inputs, and fails to capitalize on the self-repairing and self-perpetuating capabilities of ecosystems. Attempts to perpetuate a certain "state" or forest condition are unsustainable. Land managers should be managing for the naturally evolving ecosystems, rather than perpetuating artificial ones we have attempted to create. By imposing management schemes structured to optimize timber production at the expense of other ecosystem attributes, we have suppressed certain disturbance regimes, e.g. fire, while potentially increasing the effects of others, e.g., floods. The net result is a loss of ecosystem function and loss of the values that ecosystems provide including high quality water and abundant fisheries. Our actions have led to increased probabilities that various series of natural events will be increasingly viewed as catastrophic. Therefore, we need to consider the whole landscape, not just the forest.

The region's ecosystems, not just forests, are under severe strain.

Virtually all western landscapes, including forests, have been subjected to severe disruption by human activities. The conceptualization that we face a problem only of forest health misrepresents the problem and misdirects our attention from appropriate remedies. From a watershed perspective, the region suffers an ecosystem health problem, but the primary cure rests in curtailing human activities known to be damaging and counterproductive, and repairing or restoring roads that act as permanent sources of adverse impact. Fire influences but does not obscure this basic template.

LAND MANAGEMENT AFTER FIRES

Research results and new knowledge regarding the management of forest ecosystems increasingly indicates that dramatic changes in human impacts and fire management policies are needed. As an overriding principle, we seek ways of decreasing human impacts while allowing natural disturbance regimes to reestablish their historical influence in maintenance of the diversity and productivity of regional landscapes. Instead of focusing on effects of the fires, land managers should focus on the sources of the anthropogenic disturbances and the departure from natural disturbance regimes. Land managers should particularly examine current consequences of human disturbances at the landscape level.

POST-FIRE PRINCIPLES

We recommend that management of post-fire landscapes should be consistent with the following principles:

Allow natural recovery and recognize the temporal scales involved with ecosystem evolution. Human intervention should not be permitted unless and until it is determined that natural recovery processes are not occurring.

Human intervention on the post-fire landscape may substantially or completely delay recovery, remove the elements of recovery, or accentuate the damage. Many such adverse consequences are difficult or impossible to predict or foresee in specific situations. *In this light there is little reason to believe that post-fire salvage logging has any positive ecological benefits,* particularly for aquatic ecosystems. There is considerable evidence that persistent, significant adverse environmental impacts are likely to result from salvage logging, based on many past cases of salvage projects, plus our growing knowledge of ecosystem functions and land-aquatic linkages. These impacts include soil compaction and erosion, loss of habitat for cavity nesting species, loss of structurally and functionally important large woody debris.

Protect soils. No management activity should be undertaken which does not protect soil integrity.

Soil loss and soil compaction are associated with both substantial loss of site productivity and with off-site degradation. Decreased infiltration, increased overland flow, and excess sedimentation all directly contribute to the degradation of forest soils and the off-site degradation of aquatic systems and reduced survival of aquatic species, including salmonids. Reduction of soil loss is associated with maintaining the litter layer. Although post-burn soil conditions may vary depending upon fire severity, steepness of slopes, inherent erodibility, and others, soils are particularly vulnerable in a burned landscape. Soil and soil productivity are irreplaceable in human timescales; therefore, post-burn management activities that accelerate erosion or create soil compaction must be prohibited.

Preserve capabilities of species to naturally regenerate.

From an ecological perspective, there is frequently no need for artificial regeneration. Artificial reintroduction of species will circumvent natural successional changes, are often unsuccessful and will have unanticipated side effects even if successful. If native species are failing to reestablish naturally, that failure will frequently be associated with other reasons than the absence of seed sources or colonists. If warranted, artificial regeneration should use only species and seed sources native to the site, and should be done in such a way that recovery of native plants or animals is unhampered.

Do not take actions which impede natural recovery of disturbed systems.

Delays in recovery may increase the likelihood of extirpation of stressed populations, or may alter the pathway of recovery altogether. As a practical example, areas that have experienced the effects of a severe burn and are likely to exhibit high erosion should not be subjected to additional management activities likely to contribute to yet more sedimentation. Efforts should focus on reducing erosion and sedimentation from existing human-caused disturbances, e.g., roads, grazing, salvage logging.

Salvage logging should be prohibited in sensitive areas.

Logging of sensitive areas is often associated with accelerated erosion and soil compaction (Marston and Haire 1990), and inherently involves the removal of large wood which in itself has multiple roles in recovery. Salvage logging may decrease plant regeneration, by mechanical damage and change in micro-climate. Finally, logging is likely to have unanticipated consequences concerning micro-habitat for species that are associated with recovery, e.g., soil microbes. Salvage logging by any method must be prohibited on sensitive sites, including:

- in severely burned areas (areas with litter destruction),
- on erosive sites,
- on fragile soils,
- in roadless areas,
- in riparian areas,
- on steep slopes,
- or any site where accelerated erosion is possible.

On portions of the post-fire landscape determined to be suitable for salvage logging, limitations aimed at maintaining species and natural recovery processes should apply.

Dead trees (particularly large dead trees) generally have multiple ecological roles in the recovering landscape including providing habitat for a variety of species, and functioning as an important element in biological and physical processes (Thomas 1979). In view of these roles, salvage logging must:

- Leave at least 50% of standing dead trees in each diameter class.
- Leave all trees greater than 20 inches dbh or older than 150 years.
- Generally, leave all live trees.

Because of soil compaction and erosion concerns, conventional types of ground-based yarding systems (tractors and skidders) should be generally prohibited. New equipment or techniques may be suitable where it can be demonstrated that soil integrity will be protected, that is, where acceleration of soil erosion and increased soil compaction can be demonstrated not to occur, and where there is no impairment of hydrologic and biological soil integrity. Helicopter logging and cable systems (particularly those that provide partial or full suspension) using existing roads and landings may be appropriate as may be horse logging; however, even these methods are not without potential problems and could locally increase runoff and sediment. Therefore, they must be actively monitored and avoided where sedimentation is already a major problem for salmonids or other sensitive aquatic species. Any activity that disturbs litter layers or soil surface horizons, either pre- or post-fire, can accelerate soil erosion and sediment delivery to aquatic systems.

Because of the wide range of chronic ecological effects associated with roadbuilding, the building of new roads in the burned landscape should be prohibited.

Roads are associated with a variety of negative effects on aquatic resources, including disruption of basin hydrology and increased chronic and acute sedimentation. Under no circumstances should new roads be introduced into sensitive areas, including roadless or riparian areas. Outside of these areas, road building should be avoided except where new road construction may be necessary to complete a larger program of partial or complete road obliteration. In such instances, offsetting benefits must be demonstrated. These may include cases in which a new road segment has been demonstrated to be necessary to enable the obliteration of other roads that cause significant potential or existing adverse environmental impacts.

Active reseeding and replanting should be conducted only under limited conditions.

In general, active planting and seeding has not been shown to advance regeneration and most often creates an entirely new, exotic flora. In addition reseeding is associated with additional problems and costs. Therefore, such practices should be employed only where there are several years of evidence that natural regeneration is not occurring. For example, native species from regional stocks that may enhance fire resistance of a site may be planted if the effect is not to homogenize the landscape, (e.g., alder in southwestern Oregon and Northern California).

Introduction of non-native species or exotic genotypes or native species should be prohibited from all reseeding/replanting programs. Seeding grasses into burned forests has been shown to disrupt recovery of native plants and is likely to create more problems than it solves (Amaranthus et al 1993). The use of pesticides, herbicides and fertilizers should generally be prohibited. Spot-specific hand application of herbicides only for the removal of exotics may occasionally be considered if there is evidence that such action is likely to lead to long term reclamation of the site.

Structural post-fire restoration is generally to be discouraged.

Frequently, post-fire restoration efforts involve the installation of hard structures including sediment traps, fish habitat alterations, bank stabilization, hay bales, weirs, check dams, and gabions. Such hard structures are not generally modeled or sited on the basis of natural processes, and their ability to function predictably may be particularly low in dynamic post-fire landscapes. Hard structures have high rates both of failure and of unanticipated side effects. Therefore, structures are generally an undesirable and unsuccessful method for controlling adverse environmental impacts.

Sediment management should focus on reducing or eliminating anthropogenic sources prior to their initiation (e.g., improve stream crossings to prevent culvert failure), and protecting and maintaining natural sediment control mechanisms in burned landscapes, particularly the natural recruitment of large woody debris on hillslopes and in streams. The goal should be to reestablish the natural post-fire background quality, quantity and timing of sediment, including the presence of large woody debris, and this level should be considered the baseline.

Post-fire management will generally require reassessment of existing management.

For example, the condition of a transportation system (i.e., pre-existing roads and landings) should be reassessed after a fire. By increasing runoff, erosion, and sedimentation, fires may increase the risks posed by existing roads. Therefore, post-fire analysis is recommended to determine the need for undertaking road maintenance, improvement, or obliteration. There is some urgency to this reassessment as the longer appropriate treatments are put off, the more likely it is that failure will be triggered by a large runoff event.

Additionally, post-fire livestock grazing should be altered or eliminated to allow natural recovery processes to occur.

Continued research efforts are needed to help address ecological and operational issues.

There is a need to research certain questions in order to guide post-fire management decisions. For example, some people argue that salvage logging is needed because of the perceived increased likelihood that an area may reburn. It is the fine fuels that carry fire, not the large dead woody material. We are aware of no evidence supporting the contention that leaving large dead woody material significantly increases the probability of reburn. There is a regional need for retrospective analysis concerning the probability and effects of "reburn". Sites exist throughout the western United States where the risk and consequences of reburning of already burned landscapes may be retrospectively addressed. This analysis must precede any management recommendation based on the probability of reburning.

Research is needed on the role of dead wood in terrestrial ecosystems -- in particular, how much wood should be left on a particular site and across the landscape to provide for the full range of ecosystem processes and the needs of species. Some whole watershed retrospectives should be developed. Continued research is needed on the fire ecology of forest and riparian areas.

Although historical research and experience has highlighted the adverse effects of ground based heavy equipment, roads, and harvest in riparian areas, new research efforts are needed to evaluate the environmental effects of alternative post-fire/salvage operations, roading activities, and site preparation.

Additional information must be provided to the public regarding natural fires and post-burn landscapes to provide balance to the "Smokey Bear" perspective of fires and forests.

Although post-fire landscapes are often portrayed as "disasters" in human terms, from an ecological perspective, fire is part of the normal disturbance regime and renewal of natural forest ecosystems. An increased appreciation and understanding of natural disturbance regimes in the ecology of forest ecosystems is needed by the public, and the public's land managers.

RECOMMENDATIONS CONCERNING FIRE MANAGEMENT

Fires should be allowed to burn naturally when feasible. In some drier forest types that may be prone to intense fires and that are irreplaceable wildlife habitat, prescribed fires or underthinning to remove fire ladders (leaving the larger, fire resistent trees) may be considered to reduce fuel loads. Fire suppression may also be necessary to accomplish the short-term goals of protecting human structures and lives. Prescribed burning may be a useful tool in reducing fuels around developed areas and may make it easier to protect those areas. Large fires will likely be necessary (and inevitable) to maintain or restore some landscapes – particularly lodgepole and spruce fir forests – in the western United States to their historical patterns (Baker 1992, 1994; Turner and Romme 1994).

Policies should be developed to reduce the number of human structures within areas with high potential for fires. New structures must be discouraged in fire prone areas. If healthy forests are to be recovered, then one has to be able to manage those without undue concern for human structures. Fire suppression policies across forest ecosystems should not become hostage to the encroachment of inappropriate human developments in fire-prone areas.

Fire suppression activities should be conducted only when absolutely necessary and with utmost care for the long-term integrity of the ecosystem and the protection of natural recovery processes.

The use of surface water from small streams and ponds has not proven generally effective in fire suppression. Pumping from small streams and rivers increases the risks to aquatic ecosystems from post-fire events. When pumping is utilized, it should be conducted from sufficiently large streams and lakes that the effects on aquatic biota are negligible.

Fire suppression activities should not include bulldozing stream channels, riparian areas, wetlands, or sensitive soils on steep slopes or using such areas as access routes for vehicles and other ground-based equipment.

Fire lines created by mechanical equipment should not be permitted in riparian zones, sensitive soils on steep slopes, or other ecologically sensitive areas.

Virtually no fire suppression should be permitted in wilderness areas.

When land ownerships are mixed, the federal land management agencies should establish policies to prevent conflicts between re-establishment of natural disturbance regimes on federal land and the protection of private property.

For example, federal agencies may decide to purchase easements or issue insurance policies under procedures analogous to flood insurance that would reimburse those landowners who had practiced proper forest management for the value of lost timber from natural wildfires. These policies should obviously be prospective. Recent fires only underline the need for these policy changes.

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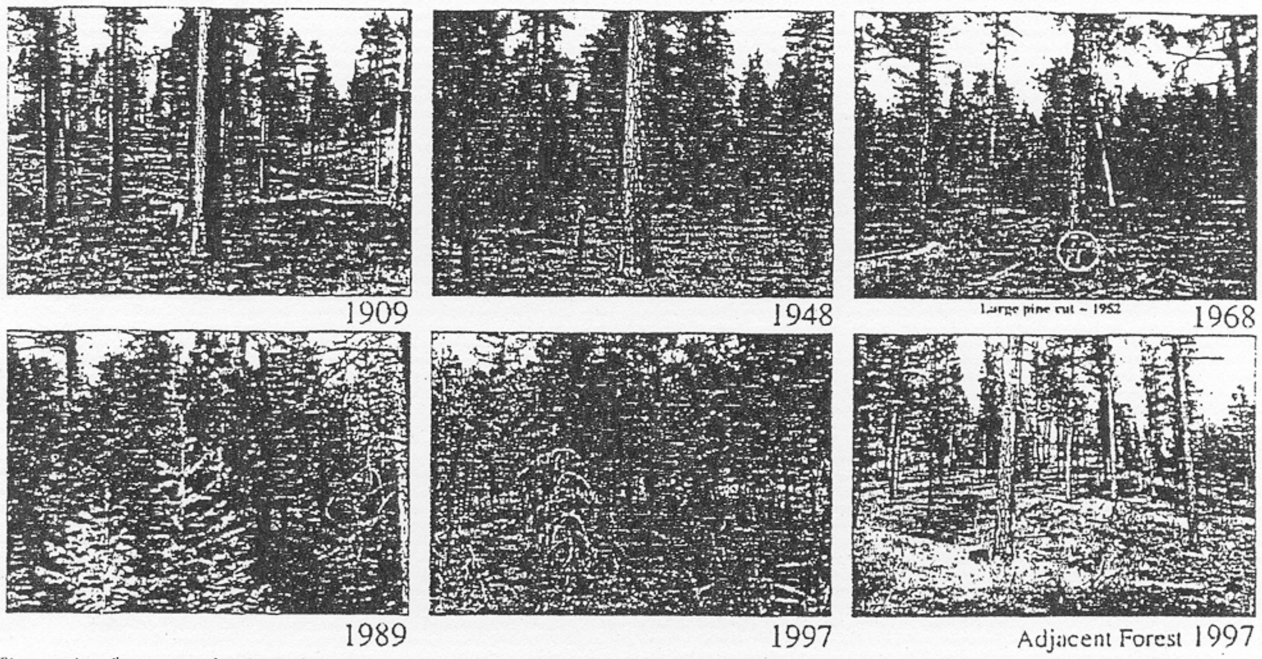
Ponderosa Poster Child:

U. S. Forest Service Misrepresenting the Historic Condition of Western Forests And the Effects of Fire Suppression and Logging

88 Years of Change in Ponderosa Pine Forest



Photos taken from one point show changes resulting from fire exclusion, removal of large pines and ecosystem management treatments in the 1990's.

Photo point location, Bitterroot National Forest – Produced by the Fire Effects Unit, Rocky Mountain Research Station, Missoula, Montana - for General Technical Report-RMRS-GTR-23, March 1999

by
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August 2000

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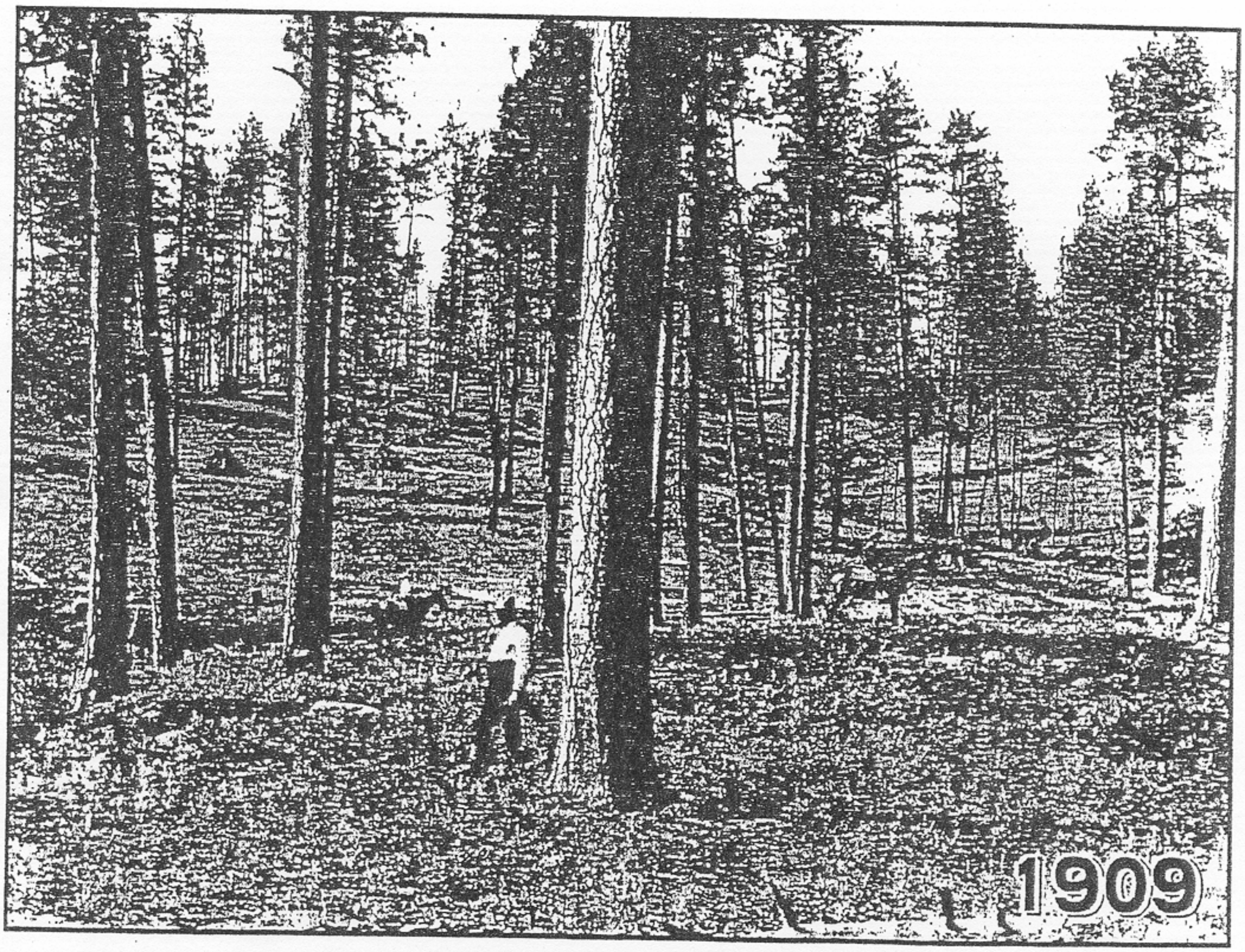
In its broadly distributed 1996 poster "80 Years of Change in Ponderosa Pine Forest," the U. S. Forest Service misrepresents the historic condition of ponderosa pine forest in the Lick Creek area of the Bitterroot National Forest in Montana. It does so by presenting as the historically occurring forest a 1909 photo of a forest recently logged to open up the canopy, as shown immediately below (USFS 1996):

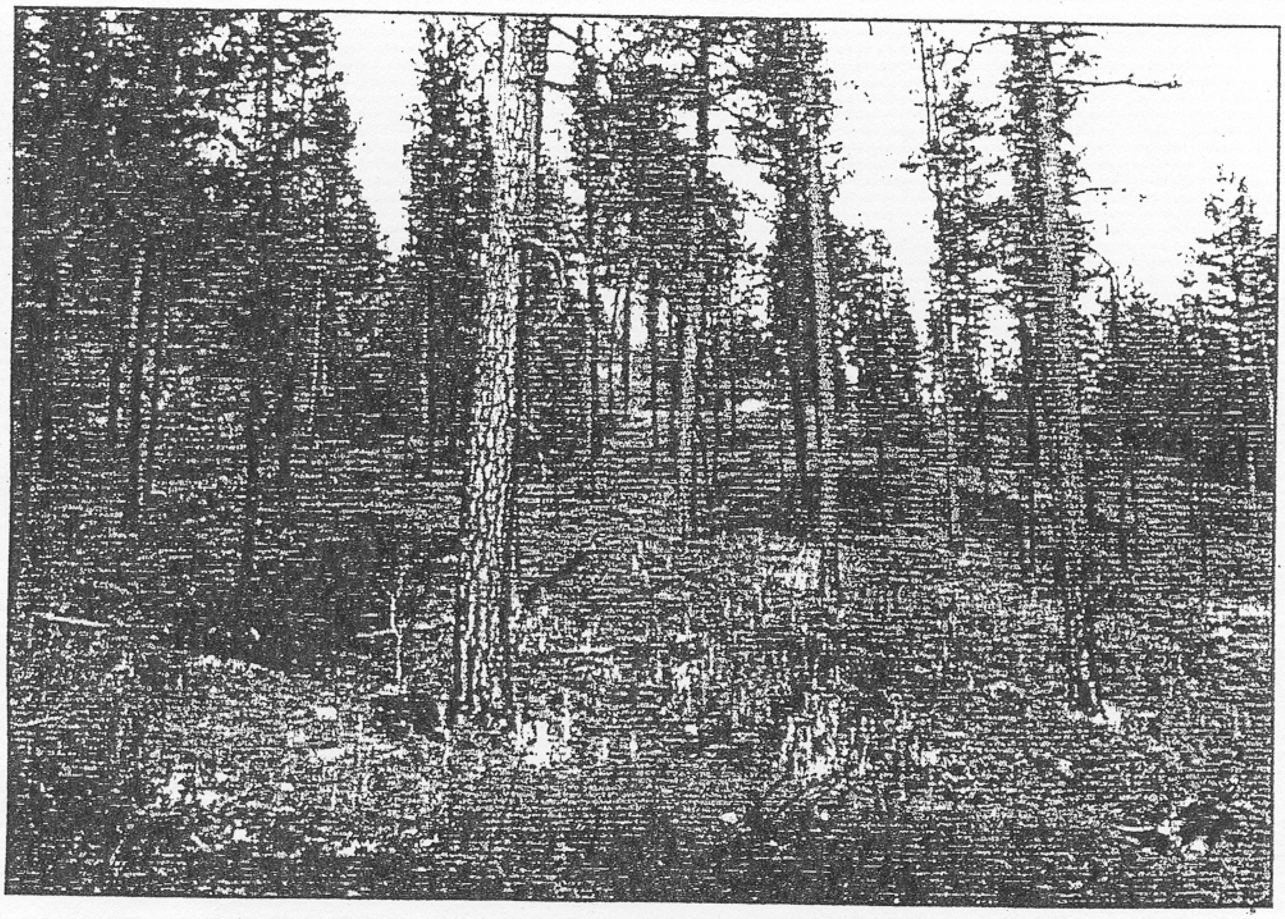


Cleanup operations on the Bitterroot's Lick Creek timber sale in 1909, falsely presented as showing historic forest conditions.

Omitted is an available 1909 photo of the "heavily stocked" Lick Creek forest "immediately before partial cutting," as shown immediately below (USFS 1995 and 1999):

Historic Lick Creek forest conditions, shown in 1909, immediately before partial cutting.

It's updated poster "88 Years of Change in Ponderosa Pine Forest" (shown on the title page of this report) furthers the deception by adding a 1997 photo of the results of "ecosystem management treatments," as shown in the photo immediately below (USFS 1999), which compares nicely to the widely-spaced ponderosa pine trees shown in the post-logging 1909 photo:



The results of recent Lick Creek "ecosystem management treatments" intended to return the forest to fictitious historic conditions.

Other Forest Service rec ds indicate the 1909 photo used fo he poster is in fact a "northwesterly view showing cleanup operations on the Lick Creek timber sale." (USFS 1983). Moreover, Forest Service studies indicate that photos of these forests taken just prior to being logged in the 1909 Lick Creek timber sale "show that although the understories were open, the stands were 'heavily stocked' with large ponderosa pine trees. [ ] Modest growth rates and relatively high basal areas of tree stems per acre attest that these early stands were fully stocked or overstocked in terms of timber production." (USFS 1982 and 1989).

Omitting the pre-logging 1909 photo from not only the posters, but a number of studies of the Lick Creek photo series, has caused widespread misunderstanding of the historic conditions of these ponderosa pine forests, leading people to believe they were more open in the canopy as well as the understory - what has become commonly referred to as "open, park-like stand[s]." (USFS 1999). This omission and misrepresentation by the Forest Service, in turn, caused the General Accounting Office in its 1999 report "Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats" to incorrectly caption the post-logging 1909 photograph a "typical open ponderosa pine stand in the Bitterroot National Forest." (USGAO 1999).

An accurate understanding of how dense these stands of ponderosa pine were historically is important in judging the effects of ecosystem management treatments intended to remedy decades of fire suppression. These treatments typically not only remove small trees and brush from the understory, but also reduce the density of larger trees in the canopy in order to improve "forest health" by decreasing competition among trees. (USFS 1999). Studies of these historic stands, however, indicate that it was the naturally occurring high density of large trees and not just frequent fires that kept the understory open:

> "In addition to fire, dominance of large pines contributed to a scarcity of tree regeneration and shrubs in the understory. Shrubs and small trees were probably also inhibited by tree root systems utilizing much of the soil moisture and nutrients." (USFS 1982 and 1999).

Indeed, the studies show that opening up the historic forest canopy encourages the establishment and growth of various shrub and tree species:

> "[T]all shrubs (especially Scouler's willow) and tree regeneration became established in direct proportion to the amount of stand opening and tree regeneration was most vigorous on the moist habitat types. [ ] Even though overstory Douglas-fir were mostly removed in the 1907 to 1911 logging, Douglas-fir regeneration increased markedly thereafter." (USFS 1982 and 1999).

In other words, opening up the historic forest canopy exacerbates the problem of shrubs, Douglas-fir and other species crowding into the understory. And, as one of the studies concludes of the 1979 condition of the forest shown recently logged in the 1909 photo: "Soil disturbance during logging and exclusion of wildfire allowed ponderosa pine and Douglas-fir seedlings to become established and develop into a dense understory." (USFS 1982).

Both posters, however, omit the fact that soil scarification during logging, not just fire exclusion, contributed to the establishment of a dense understory in what are described as historically open stands "highly stocked" ponderosa pine. ıd, again, while both posters purport to show changes "resulting from fire exclusion" and "removal of large pines," they identify only one large pine cut in about 1952, while failing to clearly indicate that scores of large pines were cut just prior to the taking of the 1909 photo it presents as though it were typical of the historic, unlogged forests.

In sum, the Forest Service posters misrepresent the historic condition of the Lick Creek ponderosa pine forests as having more open canopy by presenting as the historic condition an after-logging photo of the thinned forest. Then, "ecosystem management treatments" are presented as the means to return today's forests to this fictitious historic condition by prescribing logging which thins both the understory and the canopy. Moreover, the Forest Service intends its text book diagnosis and cookie-cutter remedy to be applied broadly:

> "Within a year of its publication, 1,800 copies of the "80 Years of Change" poster were distributed. It has been useful not only in western Montana, where Douglas-fir is replacing ponderosa pine through succession, but also in Idaho, Washington and Oregon, where grand fir and Douglas-fir both replace ponderosa pine; in California, where white fir and coastal Douglas-fir are the replacement species; in the central Rocky Mountains, where blue spruce is the major replacement species; and in New Mexico and Arizona, where white fir and blue spruce are replacement species." (USFS 1999).

Forest Service researchers have raised concerns about relying on "a poorly described and understood set of presettlement seral conditions:"

> "We question the degree to which presettlement forest conditions are understood and the feasibility and desirability of converting forests to a seral state that represents those conditions. [ ] As Hoover [formerly of the Forest Service's Rocky Mountain Research Station] observed:
>
> > 'It may be worth noting that travelers seek open stands. Few trails pass through dense stands by choice. Naturally, early wagon passengers and horseman saw open stands. Also, photographers and artists favored more open forests and avoided dense stands for their illustrations. This could bias our impression of past conditions.'" (Tiedemann et al 1999).

Indeed, Forest Service reports find not only were the historic forests in Lick Creek "heavily stocked" with large trees, but in some instances "advance natural regeneration, primarily Douglas-fir, was present in the stand prior to logging" (USFS 1999), some of it "pole-size" (USFS 1982). Moreover, Douglas-fir "made up about 10 percent of the stand volume" in Lick Creek, with "all Douglas-fir over 10 inches dbh" cut in the areas logged from 1907 to 1911 because it "was economically less desirable than the large old ponderosa pine, so silvicultural practices were aimed at perpetuating pine and reducing the fir component." (USFS 1999).

A thorough review of these reports and photos provides ample evidence that many of these forests historically did not fit the current and widely-spread notion that they consisted of open-grown, widely spaced, park-like stands of ponderosa pine devoid of ladder fuels and Douglas-fir. If anything, the report which accompanies the "88 Years" poster heightens the concern that today's ec stem management treatments are nt-loaded formulas aimed at restoring western forests to fictitious, romanticized historic conditions:

> "Coincidentally, the kinds of treatments that we report and illustrate are now widely recommended for large areas of ponderosa pine forests throughout western North America. These treatments fit the concept of ecosystem-based management that was embraced by the USDA Forest Service soon after this study began. [ ] From a management standpoint it appears that efforts to return stands to conditions similar to those in the early part of the century will result in more visually pleasing scenery than if overstocked thickets develop." (USFS 1999).

Simply put, the "88 Years" poster visually demonstrates that "ecosystem management treatments" applied in the 1990's produce results similar to what in 1909 was "the first large ponderosa pine timber sale in what is now the Northern Region of the USDA Forest Service." (USFS 1999). The poster demonstrates that such treatments do not result in the more "heavily stocked" and more closed-canopy forests that existed prior to the first timber sales.

The Forest Service has launched widespread and massive efforts to restore remnant ponderosa pine and mixed species forests to fictitious historic conditions by logging these forests to open the canopy as well as the understory. Such logging is being pursued in timber sales like the Meadow Smith Project in Montana's Swan Valley, in spite of Forest Service documents which acknowledge: 1) harm to species such as pileated woodpecker and pine marten, which prefer closed-canopy forests, 2) an increased risk of spreading noxious weeds, and 3) 1930's inventories indicating the historic condition of the forest was primarily a mixture of mature Douglas-fir and ponderosa pine providing the closed canopy necessary for wintering whitetail deer. (USFS 2000). Equally as troubling are the findings of the experimental ecosystem management treatments in the Lick Creek studies:

> "Concurrent impacts of the thinning and burning activities were mortality of understory vegetation, soil disturbance that led to spread of knapweed, reduction of potentially mineralizable nitrogen, lessening of esthetic values, and reduction in habitat of certain birds." (USFS 1999).

In summary, the Forest Service is widely distributing false propaganda in an attempt to convince its employees and the public of the merits of "ecosystem management treatments" purported to remedy "forest health" problems by returning today's forests to their historic conditions. Behind the Forest Service's promise of tidier, healthier and better looking forests, however, lies its wealth of scientific evidence indicating these forests will neither be healthy nor function like the forests that existed historically in the American West.

An electronic version of this report, in pdf format,
is available at www.wildrockies.org/swanview

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